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no.21

# THE PRACTICAL PHOTOGRAPHER

(LIBRARY SERIES)

EDITED BY REV. F. C. LAMBERT, M.A.

NUMBER 21.

The Pictorial Work of Harold Baker.

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(Vide p. 30.)

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# The Practical Photographer.

## Library Series. Orthochromatic Photography. No. 21.

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# Editorial and other Notes.

**The Practical Photographer's Annual and Dictionary of Daily Practice is now ready.** For explanatory note see page viii.

## The Contents of our Next Number (ready July 1st).

Our forthcoming volume (No. 22 of the present series) will be devoted to **Figure Work, Groups, Genre Pictures,** and kindred topics. With many valuable practical suggestions for the hand and stand-camera worker.

This number will contain several choice reproductions of the work of Wm. Rawlings.

Other numbers now in active preparation will deal with **River, Lake, Marine and Seascape. Combination Printing. Copying. Night Photography. Flash-light Work. Photographic Curiosities (Ghosts, Doubles, etc.). Ozotype. Telephotography. Iron Printing. Oil Printing. Minor Printing Processes. Lenses. Photographic Optics. Chemistry for Photographers. Photo-micrography. Stereoscopy. Optical Lantern. Trichromatic Photography. Finishing the Print. Pictorial Composition** (second part). **Gaslight Papers. Portraiture** (second part), **etc.**

N.B.—Will readers who feel disposed to co-operate in the preparation of any of the above numbers kindly communicate with the Editor forthwith?

The Editor is always willing to give careful consideration to *Short Practical Notes* on any of the subjects in preparation.

All matter published is paid for at one uniform rate.

## A Query re Binding "The Practical Photographer."

We have had numerous enquiries and suggestions as to a bound edition of *The Practical Photographer*. Will those of our readers who are prepared to place a six months' prepaid order for cloth-bound copies (at 1/6 each net) kindly send us their names and addresses, but not send any money until they hear from us again, as the feasibility of this scheme must depend upon the number of definite orders received.

## Criticism of Prints.

It is our desire to make the criticism of prints a special feature in our pages. The Editor gives his personal careful attention to this matter, and aims at making every criticism a practical, interesting, and instructive object-lesson. By paying attention to the hints thus given, often a poor print may be improved and a good print followed by one still better. In order to encourage readers to take great care in the preparation of the prints they send us, we offer **Fifteen Shillings in Prizes** for the best three, four, five, or six prints sent in each month. The winning prints will not be returned. (See Coupon).

## Gum-bichromate Competition: Awards.

The number of entries for this competition was quite up to our expectation, and the quality of the work decidedly better than our anticipations. We extend our hearty congratulations to the following, who well deserve the awards assigned to them after very careful and critical examination of all the prints sent into this competition.

**Silver Plaque.**—J. C. Batkin, "Dordrecht."

**Bronze Plaque.**—C. E. Levy, "I'm the Monarch of all I survey."

**Certificates.**—E. H. Atkin, "The Sunlit Smithy"; G. Gorton, "Dawn on the Torridge"; C. J. P. Cave, "Beech Trees."

## General Notices.

1. It is particularly requested that any errors in the spelling of **Award Winners' names** should be notified to the Editor immediately they are observed.

2. Will contributors to our various competitions kindly refrain from sending *under one cover* prints for *different* competitions? This not only gives us considerable trouble, but involves the risk of the various pictures not being properly entered for the competition for which they are intended. It is far better for all concerned to send each lot of prints in separate parcels.

3. Will competitors please notice that the latest date for receiving prints or our competitions is that given on the coupon, and that we *cannot admit late arrivals?*

4. Will competitors please bear in mind (1) that the judging and criticism cannot be done until after the closing date of the competition, (2) that we go to press before the 25th of the month, and (3) that the criticism of a large number of prints takes considerable time?

5. In response to numerous requests from our correspondents we have pleasure to announce that we will do our best as far as space permits to reply to queries of a photographic nature. Will querists please (1) write plainly, (2) on one side of the paper, (3) as briefly as is consistent with clearness, and (4) give us the indulgence of their kind patience? (*Vide* Coupon).

6. To meet the convenience of those readers who are preparing prints for special dates (exhibitions, etc.), and cannot conveniently wait for printed criticism in our columns, we have arranged that readers may send us one, two or three prints with the usual Print Criticism Coupon and a fee of *one shilling for each print sent.* Within a week the prints, accompanied by a criticism, will be returned to the sender. The return postage must be prepaid in the usual way as in Rule 5 (*vide* Coupon). The fee must be sent with a letter (marked "Print Criticism Special") and coupon to the Editor, and not enclosed with the prints. Each print must bear on the back the name and address of the sender.

## Print Criticism. Awards:

Again the competition has been very keen this month. One or two of our former winners are slipping back, while several others are making rapid strides forward. The following are the first six and take the awards this month:—H. S. Prince, "The Close of Day"; E. H. Atkin, "The Canal Boat"; F. Melton, "The Queen of the Ocean"; F. H. Cliffe, "In the North Aisle, Gloucester"; A. Turner, "At Work"; F. A. Tinker, "Ploughing." The following next six are all highly commended and are pressing very closely on the heels of the winners:—H. J. Blane, E. P. M. Davey, J. J. C. Shelly, A. Webb, P. Leuba, J. C. Stevenson.

**This Coupon Expires June 30th, 1905.**

THE PRACTICAL PHOTOGRAPHER. COUPON NO. 46.

### Prints for Criticism (or Queries).

**RULES.**

1. Write legibly, on one side of the paper only.
2. Put your name, address, and a number on the back of each print, and enclose this coupon.
3. Do not send more than three prints with one coupon.
4. State the *Month*, *Hour*, *Light*, *Plate Speed*, *Stop*, *Exposure*, *Developer*, *Printing and Toning* process employed.
5. If prints are to be returned, a stamped and addressed label or envelope *must* be sent **with the prints.**
6. The Editor reserves the right of reproducing any print sent in for criticism.
7. Prints should be addressed:—THE EDITOR OF *The Practical Photographer* (Print Criticism), 27, PATERNOSTER ROW, LONDON, E.C.

## The Fourth Junior Salon: Awards.

The number of entries for this competition was practically equal to the number for the previous Salon. But this time the competition was a stage keener. In a few instances some of our old friends did not come up to our expectations. In several other cases some of our younger workers have greatly pleased us with the solid progress they have made.

**Silver Plaque.**—H. O. Banister, "The Last Touches."

**Bronze Plaque.**—W. H. House, "The Narcissus: A Portrait Study."

**Extra Bronze Plaque.**—W. R. Davis, "A Sussex Homestead."

**Certificates.**—J. C. Stevenson, "Alas! Alas! for Byegone Days"; Geo. Brown, "Fruit Study"; G. A. Fowkes, "Reflections—Rotterdam"; A. G. Thistleton, "A Sunlit Porch"; F. Judge, "At Rye, Sussex"; W. G. Hill, "Her homely pleasures glide, unrestrained by envy, discontent, and pride"; W. J. Appleby, "Low Tide, Chichester"; W. H. Nithsdale, "Out in the Cold World"; R. Marshall, "A Busy Corner of the Docks."

**Highly Commended.**—J. J. C. Shelly, H. Essex, J. R. Richardson, E. O. Hoppé, C. J. Hankinson, J. Smith, F. H. Cliffe, A. H. Wilson, H. Y. Sümmons, J. D. Leigh, W. H. Gale, A. H. Sayers, J. R. Sandilands, O. W. F. Thomas, H. P. Wight, A. Turner, J. J. Rutherford, A. Lawrence, A. E. Morris, C. H. Joy, A. Haynes, S. Lister, W. Walker.

THE PRACTICAL PHOTOGRAPHER. COUPON NO. 47.

**Orthochromatic Photography Competition.**

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WRITE LEGIBLY.

**This Coupon Expires September 15th, 1905.**

## Orthochromatic Photography Competition.

**A Silver, and Bronze Plaque, and Certificates will be placed at the disposal of the Judges.**

1. This Competition is designed to draw attention to the study of orthochromatic photography.
2. The subjects chosen must be photographed on an ordinary plate or film, and again on an orthochromatic plate or film. A print from each negative is made. The two prints are mounted and together form one pair.
3. Competitors may submit one, two or three (but not more) pairs of prints.
4. Each print must bear on the back of the mount the title, name and address of the producer, and full details as to date, plate, stop, exposure of the negative. Also details of the printing process.
5. Marks will be given for Technical and Pictorial quality. The mounting and titling will also be taken into account.
6. The Editor reserves the right to reproduce *any* prints sent in to this competition.
7. The Winning Prints will *not* be returned. Others will be returned, together with a brief criticism, if a stamped and addressed envelope or label be sent **with the prints.**
8. Prints must reach us not later than **Sept. 15th, 1905,** addressed:—

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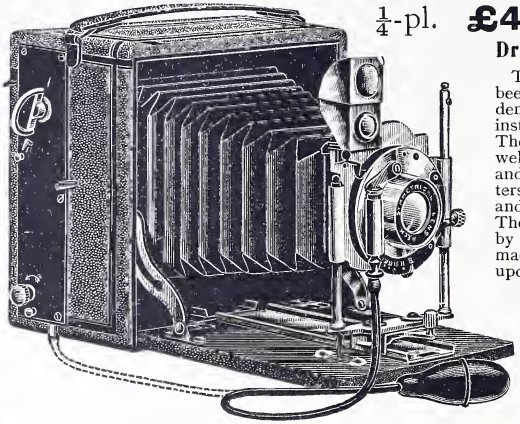

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Harold Baker.

MISS LILY HANBURY.

# THE PRACTICAL PHOTOGRAPHER.

**Library Series.** **No. 21.**


## The Pictorial Work of Harold Baker.

By THE EDITOR.

MR. HAROLD BAKER is another instance of a townsman born whose chief pictorial affections are given to the country. His happiest moments are spent either in a boat quietly drifting along by the world-famous banks of the historic Avon, or rambling along the leafy lanes of some Warwickshire wayside hamlet, or wandering among the dancing lights and shadows of some umbrageous glade. In his case the pictorial instinct is "in the blood." Not only is his father a landscape artist, but the same profession has claimed three of his brothers. And it is interesting to note that Mr. Baker, senior, whose striking portrait is herewith reproduced—though a full-ripe octogenarian—is still hale and hearty and has not yet laid aside the palette and brush.

Baker, *père*, showed his wisdom by giving Harold an art-school training under the well-known E. R. Taylor, of Birmingham. With this home and academic atmosphere of Art it is no wonder that our artist took to picture-making as naturally as the proverbial duck takes to water. And yet, curiously enough, among the favourite subjects of

his youthful study was that most prosaic and exact of sciences—chemistry. This unexpected combination is noteworthy, for it enables us to understand how it is that Mr. Baker's photographs are not only always interesting for their pictorial suggestions, but also show good, sound, technical quality as well—a happy combination which we would be glad to see more general.

Mr. Baker's tastes are in sympathy with those of the antiquary, and pictures of mediæval life are among his favourites. One need hardly say that architecture also strongly appeals to him, for his work in this direction is well known. Living within easy reach of Warwick, Kenilworth and Stratford-on-Avon, it is easy to understand that Scott and Shakespeare are two first favourites.

Turning now to camera craft, those who know Mr. Baker's work will not be surprised to learn that he believes in using the best lenses, plates, etc., that the worker can afford. In printing processes he is an all-round worker, including gum bichromate, which just now is receiving his special attention. Among the subjects which have engaged his sympathies are paintings by the Old Masters, and he has used the camera for copying many of these, and learned to love these Giants, one and all, from Holbein to Watts. We most heartily agree with him in regarding these classics of Art as of inestimable value to photographers as material for frequent and thoughtful study.

Referring to the interesting question of photography as an art process, he says, "Its literalness is at once its weak and its strong point, and that while it will never be a *Fine* Art process, it is, nevertheless, capable of much Art expression." In this discriminating opinion he has admirably summed up the situation, and many—probably most—unprejudiced and capable thinkers will support this verdict. The best friends of photography are certainly not those who in a well-meaning, but misguided, enthusiasm claim too much. Like all other means of artistic expression it has its limitations, as well as its special qualities,

and it is as foolish to ignore the one as to misuse the other.

Fig. 1. **Miss Lily Hanbury.**—A charming portrait picture, for which we have only words of admiration. It illustrates a particularly happy combination of unusual pose and unusual lighting, which together form a result as pleasing as it is unconventional. We here have a softness of definition and breadth of lighting which should prove very helpful to those of our readers who are interested in portraiture, and wish to combine the poetry of the pictorial with the prose of personality. We note that the top of the head comes unusually near the top margin of the print, but no doubt this has been done with a special purpose.

Fig. 5. **On the Avon.**—A bit of the stream which will ever be associated in thought and name with the world's greatest poet; and the poetic, impressionistic treatment of this "bit" is quite in keeping with the subject. A picture of this kind is not fitted for analysis, but for grateful reception. It at once shows that what in ordinary hands might be most uninteresting and entirely commonplace is, by sympathetic treatment, a poem without words, and yet brings to mind Wordsworth's lines:

> "When the stream
> Which overflowed the soul was passed away
> A consciousness remained that it had left,
> Deposited upon the silent shore
> Of memory, images and precious thoughts
> That shall not die, and cannot be destroyed.

Fig. 2. **Anne Hathaway's Cottage.**—This picture has not only the interest attaching to the erstwhile associations of the place, but also its own picturesque charm. It is an admirable example of directness and strength, due to a broad arrangement of light and shade. We here see the forceful and convincing effects of the one strong high-light of the window, the neighbouring secondary light on the door, floor, etc., close by, and surrounded on all sides, not by blackness and vacancy, but by

reposeful lower tones, rich in gradation, yet quiet and harmouious withal. The composition prompts the question as to whether a lower position of the lens would not have given a better suggestion of the floor space. The difficulties of dealing with cottage interiors are by no means trivial, and the picture before us is one which is full of valuable hints and suggestive ideas.

Fig. 3. **Portrait of S. H. Baker.**—A forceful and yet unaffected portrait of the artistic father of an artistic son. We here see the value of the velvet skull-cap, giving us a patch of strong dark. In our reproduction the right hand white shirt cuff is perhaps a little too assertive, and the student must imagine this slightly subdued. It is open to question the advisability of using quite such large letters for inscribing the name and age, etc., of the sitter. The portraitist may glean several valuable hints in posing the hands and arms as well as lighting the head and figure from this example.

Fig. 6. **Warwick Castle.**—A noble pile, rich in historic association from the days when here stood stronghold of the Roman occupation. Our reproduction, which is also a reduction in scale, does not adequately retain the acceptable suggestion of atmospheric softness which is present in the original work. This is one of the many subjects in our land which seem to call for some slight suggestion of very softly subdued colour. To separate these time-worn walls from the subtle shades and tints of age seems to rob them of their poetic essence. The student will hardly fail to notice how admirably the chimney smoke softens the drawing of the various chimney-stacks, and seems to strike a happy note of the dreamy, sleepy quietness of a place with a noteworthy past.

Fig. 8. **The Countess of Warwick.**—An example of an "at-home" portrait which cannot fail to be of especial interest to those of our many readers who indulge in the fascinating occupation of amateur portraiture at home. It shows some of the difficulties of dealing with sitters surrounded

Anne Hathaway's Cottage.

Fig. 2 (p. 3).

Harold Baker.

by objects in the background which the painter easily omits, and which the photographer would gladly omit if it were possible. The next best thing to do is to follow Mr. Baker's example, and treat them as broadly as possible, subduing detail as far as the lens will permit.

Fig. 7. **An Interesting Story.**—Only just a few more pages to finish the volume, and so she leans forward to get the best of the light on the engaging pages. Note the value of a quiet background, the concentration of chief lights about the face, and that the lines of the composition happily accord with the horizontal form of the picture. This is a happy example of what may be learned by the "art of leaving out" the things which are not essential to expressing the idea.

Fig. 4. **The darkened roof rose high aloof.**—Here we have Mr. Baker at home, as it were, among the old buildings that he loves so truly, and has dealt with so sympathetically. The general management of this somewhat difficult subject is an admirable lesson for the architectural worker. The high, vaulted roof, though dimly lighted, is not without gradation and sufficient detail. The secondary lights are duly subordinate to the chief light. The foreground is wisely kept quiet and uncomplicated, so that the chief attention may be given to the "peep" beyond and between the near pillars.

The most casual observer cannot have failed to notice the great *variety* of subject which our small selection of Mr. Harold Baker's work brings before us. Not only have we examples of architecture, portraiture, landscape, but also we find that each example receives its own appropriate treatment, and thus we have not only interest, but valued teaching as well. We are sure that our readers will join us in asking Mr. Baker to accept our very hearty thanks for his kindness in lending these prints for reproduction, and also for the many valuable lessons, hints and suggestions which they contain.

## Introduction to Orthochromatic Photography.

PROBABLY every reader of this number has already observed that the ordinary photographic plate often gives us a misleading idea of the lightness and darkness of coloured objects. Thus the *blue* sky with *white* or light clouds is usually represented by blank *white* paper in our print. The bright *yellow* or golden cornfield, which looks lighter and brighter than the *blue* sky in nature, comes out much darker than the sky in our picture. The bright blood-*red* poppies among the corn print out as black spots, and so on. Similarly in portraiture the person with yellowish or reddish hair, in our print seems to have dark hair. Freckles which we hardly notice in nature show as clear spots in our negative and assert themselves as dark spots.

Unfortunately all this has now been the case in photography for so many years that we have partly got accustomed to these untruths, and almost learned to think they are inevitable. But this is not the case. And one of the chief objects of this "coming of age" number of *The Practical Photographer* is to stimulate photographers generally to depart from these "make-believes" of our youth, and try to make our prints more truthful in their light and shade rendering of bright and dark colours.

**Orthochromatic Photography.** For the moment we may say that with the help of orthochromatic plates and coloured screens we are now able to avoid the greater part of these false renderings. It is quite possible to use these comparatively modern aids following the "rule-of-thumb," without going into the why and wherefore of what we are doing. But the possession of a very modest amount of theoretical knowledge, which can very easily be acquired without diving into the deeper technicalities, will, unquestionably, enable the worker to produce a better average of results

with fewer failures and consequent saving to his pocket, time and temper. The object of these introductory notes is to put the reader in possession of enough theory for everyday practical use. He is therefore strongly advised not to skip this simple outline. Often "the longest way round is the shortest way home," and this will certainly be found the case in photographic operations generally.

**What is Light?**

It is much easier to ask than to answer this question. As yet we do not know what light *is*, though we know many interesting things *about* it.

If we put a cold black poker in the fire it will get "red hot," *i.e.*, we can then carry this "red-hot" poker into a dark room and find that it gives out a dull kind of light. But presently we find this effect departs or ceases, and our red visible poker becomes black and invisible in the dark room, although we may perceive by various means that it is still warm. If we put a bit of magnesium wire or ribbon in a candle flame it bursts into flame giving us a brilliant light. In this case the flexible metal wire is changed into a light powder. Again, a current of electricity sent along a wire under certain conditions causes the wire to glow or become luminous. These changes of condition of the poker, magnesium, etc., have taken place outside our bodies and we have perceived them by means of our eye or light-perceiving nerve-organ. But pressure applied to the eye-ball may also produce a similar sensation of light, and when the optic nerve (connecting the eye and brain) is cut, a flash of light is perceived. Certain diseases also are accompanied by irregularities of vision. Many other instances might be given, but enough has been said to show that this sensation of light may arise from various causes other than the chief one, *viz.:* the sun.

**What is Colour?**

Here again we might repeat the answer given to the previous question, that we do not know what colour *is*, though we are familiar with many observations in connection with it. Some

people recognise a difference in colour between two objects which to other eyes may seem the same colour.

**Colour Blindness,** The inability to distinguish colours affects about 3 per cent. of the population and is more common among men than women. It may take various forms and degrees, the most common being the inability to distinguish between red and green. In some cases the person may have one normal and one colour-blind eye. In others the two eyes may vary in their power of recognition of slight differences of colour. Eye fatigue, disease, and certain drugs affect colour perceptions.

It has been stated that "pitting" by small pox may be prevented by confining the patients to a room illuminated by red light. Different coloured lights have different effects on the mentally affected. The common house fly shuns a room glazed with blue glass, etc.

To sum up we may say that light and colour are sensations, not things in the ordinary sense of the term.

**Analysis of Light.** Doubtless the reader has heard or read that white light can be split up into rays of various colours. But if he really wishes to make himself practically familiar with the elements of the matter he will not rest content with hearing or reading, but will see things for himself. A small direct-vision spectroscope can be bought for about a sovereign, and will be found a good investment, but should the reader prefer to "rig up a makeshift" for himself he can do this at the cost of two or three shillings for a small equi-angular glass prism standing about one inch high, or, failing that, he may manage with a piece cut out of the middle of a triangular chandelier glass drop.

Fig. 30 is a rough sketch of an arrangement made by the present writer. We see the lower half of a cardboard box, measuring roughly 10″ long, $1\frac{1}{2}$″ deep, 3″ wide. At one end A is cut a slit about $\frac{3}{8}$″ wide. B is a card partition with a slit about $\frac{1}{16}$″ wide. P a small prism fixed to the bottom of the box by means of a drop of seccotine.

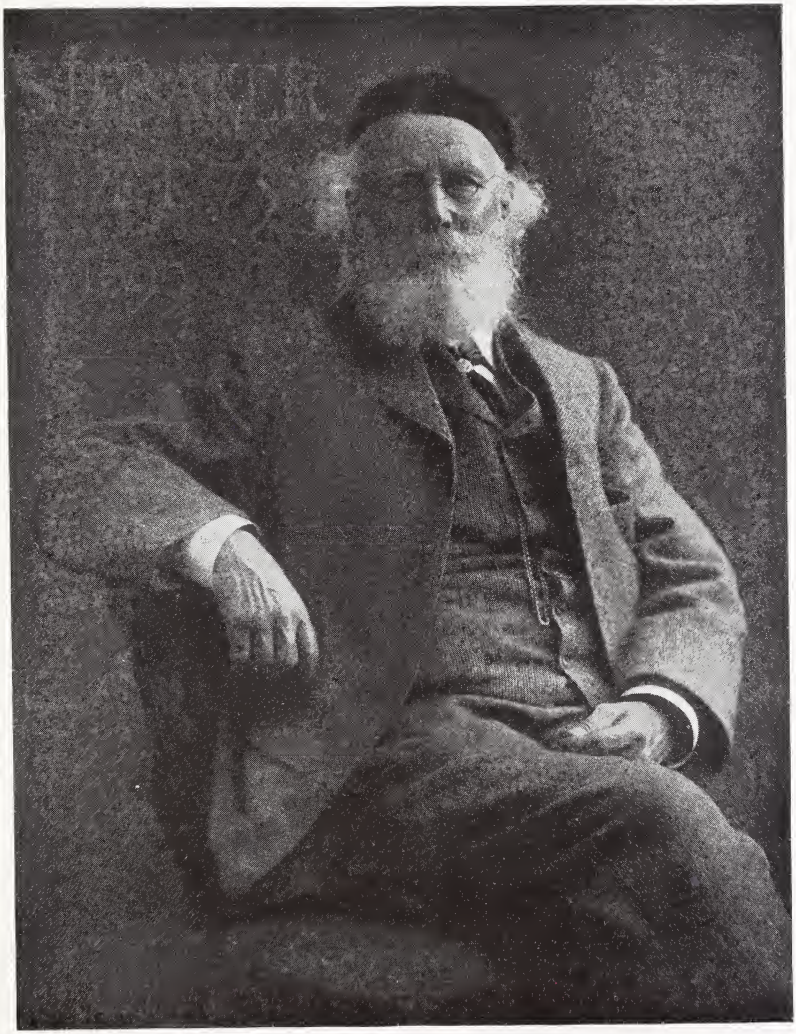


Fig. 3 (p. 4). Harold Baker.

A Portrait Study.

M N is a piece of card folded to make a topless and bottomless square box. Holes are cut in two opposite sides, and a pair of slightly magnifying lenses out of an old pair of spectacles are fixed to those ends having openings by means of a touch of seccotine. The lenses M, N, are not necessary, but are convenient as giving a somewhat enlarged spectrum.

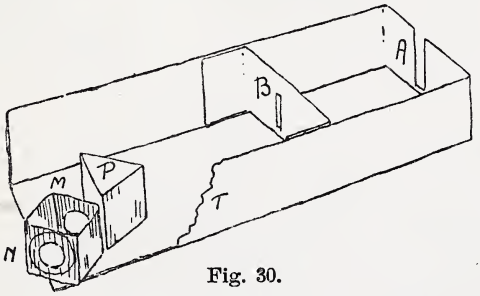



Fig. 30.

The angle at which P must be set must be found by trial, but the diagram Fig. 31 will give a rough idea as to what the angles are in that made by the present writer.

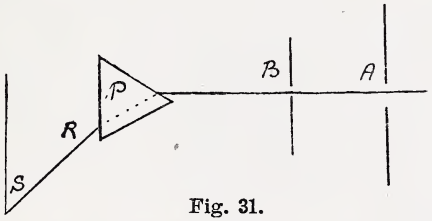
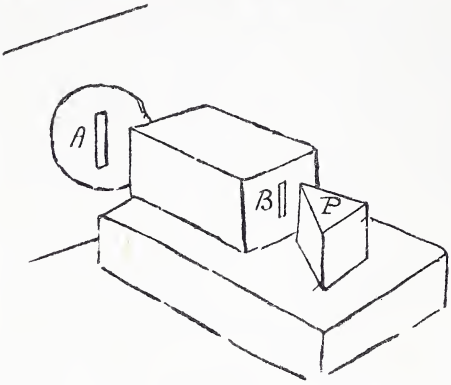



Fig. 31.

If it be desired to use the optical lantern, the objective is removed and the condenser adjusted to throw an image of the illuminant a little outside the plane of the lantern front, Fig. 32. The flange of the objective is fitted with a piece of thin card or metal A, and in this is cut a slit about $\frac{1}{4}$" wide. The lid of a quarter-plate box is taken, one end removed, and a slit $\frac{1}{16}$" wide cut in the other end B. This lid is now turned upside down and arranged to rest on a piece of blackened card and come just opposite the slit A. The prism is put opposite B, and the spectrum a few feet distant is arranged to be viewed on a sheet of white card. It is important




to shut in all the light from the lantern excepting that passing through A and B. An incandescent gas mantle will give a moderately bright spectrum about 2″ long.

Fig. 32.

**The Spectrum.** We may now assume that the reader has arranged to throw a spectrum on the screen, and is prepared to repeat a few well-known and highly-instructive experiments bearing on photographic practice. We may diagrammatically represent the apparatus as in Figure 33, where light issues through a narrow slit S and falls on a prism P, and gives a coloured band or visible spectrum of violet, blue, green, yellow, orange and red. We observe that these are only convenient names for regions, rather than exact places, and that the colours gradually merge one into the other, so that we cannot say, for instance, exactly where the green passes into the blue on one side or yellow on the other. Next we note that there are no sharp demarcations either at the violet or red ends.

If now we place a delicate thermometer in the blue region, and slowly move it through the various colours towards the red end, we find that the red end is warmer than the blue end. Moreover, on passing beyond the red into the dark part, we find the greatest heat is beyond the red, and going still further we find the temperature again falls. We have thus an invisible heat region of the spectrum. If we replace the thermometer by a suitably-prepared photographic plate—three or four times as long as the visible spectrum, so that a part projects at each end—and expose it for a while, we find on developement that the red and infra red

parts have practically no action, the bright yellow and green but very little, while the blue, dark violet, and part beyond the visible violet have most action. Hence we infer that the photographic plate is affected by rays that our eyes cannot see under normal conditions. These ultra violet rays play a very important, perhaps we may say the most important, part in the making of our negatives on ordinary, *i.e.*, non-orthochromatic plates. Hence it comes about that the ordinary plate does not give effects which correspond to what our eye sees. But that these ultra violet rays are really present in the spectrum may be demonstrated in another way. If a piece of paper be dipped in a solution of sulphate of quinine acidified with sulphuric acid, and then moved along the ultra violet region of the spectrum, the paper fluoresces with a bluish light. Various other substances show similar effects. Some people are able to see part of the ultra violet region, or a lavender-grey colour, when the usual visible band of colours is hidden from sight.

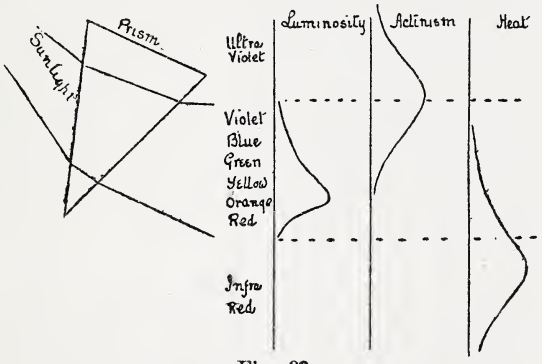



Fig. 33.

The reader must please imagine in Fig. 33 that the distances between the slit, prism and screen are *very* much greater than here represented. The horizontal dotted lines indicate the regions where the normal visible spectrum begins and ends.

The luminosity curve shows the maximum is in the yellow region.

The actinism curve, *i.e.*, of chemical or photographic interest, has its maximum just about where the violet part passes into the invisible ultra-violet region.

The heat curve attains its maximum a little beyond the visible red, *i.e.*, about the beginning of the infra red invisible region. A glance at the luminosity and actinism curves will explain how it is that the ordinary plate makes our yellow corn field come out darker than the blue sky.

Once again, if we throw a somewhat extended spectrum on our screen and look at various selected parts through two slits in a card—one slit opposite each eye—then by partly closing the eyes we can compare the relative light and dark or brightness of the various colours. We at once see that the yellow is the lightest, and the violet the darkest. If we take the luminosity of the part where the violet melts into the blue as our unit, then the full blue and deep red would be four to five, the blue-green and bright red about ten, the orange and yellow-green about twenty-five, and the bright yellow fifty. These numbers are, of course, only very rough approximations. But they show how very different is the rendering of the ordinary plate when compared with nature.

**Colour by Absorption.** The ordinary individual on looking at a landscape through a piece of red glass is apt to say that all the colours are *changed* to red. If we put this same piece of red glass in front of the slit of the spectroscope, we shall find, not that the colours of the spectrum are changed to red, but that most of them are blocked out altogether, and probably the only colours we can see are red, with perhaps a little orange and probably some green. If we cover only half the slit with the coloured glass we can then compare the normal with the absorption spectrum. Hence we may conclude that this so-called red glass owes its colour to a certain mixture of coloured rays which it permits to pass through it, while all the other visible rays are extinguished, filtered out, or absorbed. But we must not conclude that the rays or colours which we can see are all that get through. We must not forget the invisible ultra violet rays. When buying "ruby glass," etc., for the dark-room lamp, we must not conclude that we are getting a "safe" light, because our eye only perceives red rays coming through the glass.

It will be helpful to collect small pieces of coloured glass and coloured gelatine, such as we see round Christmas crackers or bonbons, and examine them through the spectroscope, noting their various absorption bands. If two such

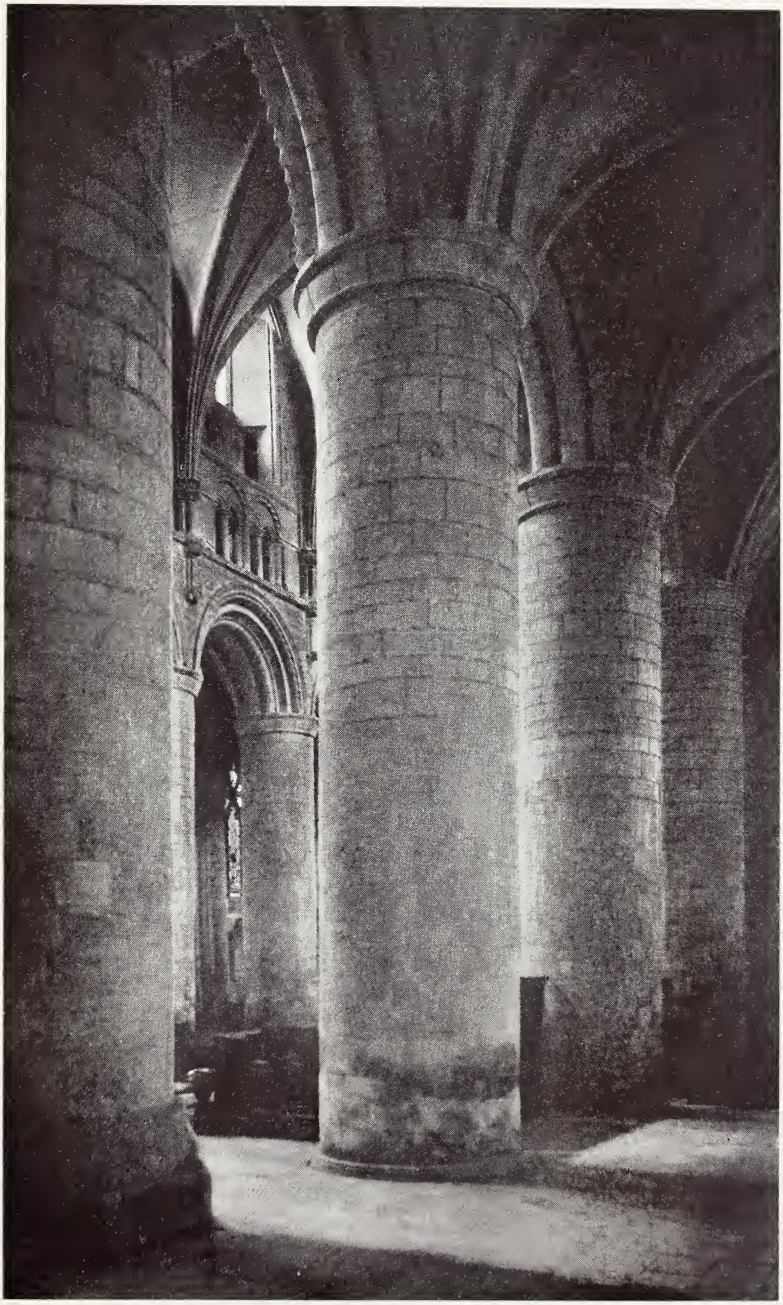


Fig. 4 (p. 5). Harold Baker.

The darkened roof
Rose high aloof.

coloured glasses, say blue and yellow, be examined singly, we shall probably find the former transmits blue and green, while the latter transmits yellow and green. Then on putting them together we find we now only see that part, *viz.*, green, which passes through them both. Similarly with other combinations.

The foregoing should be kept in mind by the photographer when dealing with such objects as stained glass windows or other forms of transparent objects.

**Colour by Reflection.** Transparent objects are, however, the exception rather than the rule in nature. If we take any non-transparent coloured object, such, for instance, as a red rose, and move it along the spectrum band, we shall find that it only appears red in a comparatively small part of the spectrum, but at all the other parts it looks black. Similarly, a green leaf appears green only in one part and black in the other parts. Holding the green leaf and red rose together we observe that in the red region the rose is coloured and leaf black, while in the green region the leaf has colour and the blossom is black. Hence we may deduce that the colour of an opaque object is due to its power to reflect certain of the component rays of white light. We may confirm by directing our spectroscope towards a coloured object. Take a piece of clean white blotting paper a couple of inches square, and across the middle draw a straight band with red ink, making the line about ¼ inch wide. Holding the paper where sky light is reflected from it view it in the spectroscope. We have a complete band of colour due to the white light reflected by the white paper. Now bring the red line into view, and note that we have very little blue and less green visible. Now place a drop of red ink on a thin bit of colourless glass and hold this in front of the slit of the spectroscope. Again we see the red ink cuts out the green and blue and passes the red and yellow. Next take a smooth coloured object, such, for instance, as a plate box covered with shiny red paper, and view this in the spectroscope by reflected light, and turning it about in various directions so as to get different degrees

of reflected light. When the surface looks a bright and shiny red we shall have a complete band of colours very similar to that from the white blotting paper, but where we avoid any shine from the surface we get red and yellow only.

We thus are confirmed in the opinion that the colours of opaque objects are due to two things, both of the greatest practical importance to photographers, viz.:

(1) Their power of absorbing certain rays and reflecting others, which gives them their colour.

(2) Their power to reflect or scatter white light in varying degrees according to the nature of their surface.

Thus a layer of soot on the bottom of a kettle absorbs *very* nearly all the visible light of all colours and reflects but a mere trace. Black is therefore not a colour, but absence of all colours. White objects (snow, opal glass, white flowers, clouds, etc.) reflect a very large proportion of the white light falling on them. Between these extremes we have an infinite variety of proportions of coloured and white light reflected by natural objects. Green leaves reflect white light in very varying degrees, according to the roughness or smoothness of their surface. (The shiny nature of ivy leaves thus makes this plant a very undesirable, though frequently used, background for out-door portraiture.) The green colour of the leaves is also in part due to red rays. Hence the need for a plate sensitive to this part of the spectrum in landscape work generally.

**Transparency and Opacity.** These are only relative terms, for it is probable that objects that we call opaque would permit some light to pass through if only the material was sufficiently thin. If a piece of gold leaf be held flat between two thin pieces of colourless glass it appears the familiar orange yellow by reflected light, but if interposed in the path of a strong beam of direct light will transmit green light. Pure water under normal conditions and in small quantities is colourless, but if looked through in

sufficient quantity appears pale blue. The colour of the sea is due to some of the incident sky light being absorbed and other components reflected. The colour of the human skin, face, etc., is similarly due to a slightly translucent layer of epithelium or skin over the more opaque and coloured tissues.

**Water-Colour Drawings.** These largely owe their charm to a combination of white and coloured light. A more or less transparent layer or wash of pigment is laid on the white paper, and absorbs some light rays, permitting others to pass through, fall on the white paper background, and be reflected back through the colour layer to our eye. We may experiment by laying lightly-coloured pieces of gelatine on white paper and other coloured materials and observing the effects.

**Oil Paintings.** These are somewhat different, and for the most part are made by the employment of so-called opaque colours, although transparent glazing colours are sometimes used in this process. It is, however, quite exceptional to apply such thin layers of pigment that the grain or surface of the supporting canvas is visible. We have seen that yellow glass permits yellow and green rays to pass through, and blue glass permits green and blue rays to pass, so that by superposing, the only rays that pass both are the green ones. Similarly, a yellow pigment reflects yellow and green light, absorbing the others, and a blue pigment reflects blue and green rays, absorbing the others. Hence, when chrome yellow and Prussian blue are mixed together we only get green rays reflected, and all others are (more or less) absorbed. In the same way, if a wash of transparent yellow, such as gamboge, is put on the top of a wash of cobalt, the incident white light sends yellow and green through the gamboge layer, and the green rays only are reflected back by the blue layer, and so again we have green as a resulting colour.

**Reflection of Ultra Violet Rays.** Reference to the diagram on page 11 will show how important are the invisible ultra violet rays in the formation of the photographic image with unscreened ordinary plates. Now, it

may here be said that the curve of actinic action is to be taken in a general rather than precise sense. Because while this curve shows the area or region of greatest activity the various salts of silver, *e.g.*, chloride, iodide, bromide, have each their own characteristic curves, which in turn vary according to the way they have been prepared, mingled, etc. Now we have seen that practically all natural objects reflect some white light, and it may be taken for granted that all natural objects reflect some photographically active invisible ultra violet rays also. Indeed, one could imagine it possible to take a photograph of an object by means of the invisible ultra violet rays only, *i.e.*, cutting out all the visible light rays.

**Colour Screens or Ray Filters.** For exact and truthful representation of Nature our *aim* is to employ—for the taking of our photograph—those rays and only those rays which the eye can perceive as colour or light and shade, and also to employ these visible effects of light in such a way that their effect upon the plate is strictly proportional to their effect upon the eye.

A glance at Fig. 33 will show us that yellow objects are the brightest and violet ones the darkest. But the violet rays are far more photographically active than the yellow rays. Clearly then we must either cut out, subdue, or modify the action of these too active violet rays, and so give longer time for the yellow rays to act, *or* we must find some means of making the yellow rays more effective, *or* we must combine these efforts on our part.

Now we have just seen that certain coloured glasses cut out, stop, or absorb certain colour bands in the spectrum. Our first care then is to find some coloured medium which will cut out or absorb the too active rays in the violet and ultra-violet regions of the spectrum. The directions for preparing these "colour screens" or "ray filters" will be found described at length on other pages. Now, although we can develop our ordinary plates in the ruby light of our dark-room, if due care be taken, yet if we were to expose our plates unduly

Fig. 5 (p. 3). Harold Baker.

ON THE AVON.

Fig. 6 (p. 4). Harold Baker.

## Warwick Castle.

to this light they would "fog." In other words our so-called "safe light"—even with ordinary plates—is only safe for a short time. Or we may otherwise put it that an ordinary plate is sensitive to red and yellow light. But its red and yellow sensitiveness is relatively so small that were we to cut out the over active rays at the other end of the spectrum the exposure for ordinary work would be inconveniently long, and in many cases impracticable. We must therefore call to our aid our second named resource, *viz.*, augmenting the sensitiveness of the plate to the slow acting colours.

**Colour Sensitizers.** It has been found that certain coloured bodies when added to the emulsion when the plate is made, cause it to be more sensitive to certain parts of the spectrum. Or we may say that they enhance or augment the colour sensitiveness of the plate for certain colours or rays. Hence these substances are called colour sensitizers, but this term should be understood to mean that they stimulate or increase the sensitiveness which is already present in a feeble degree, rather than inducing a new state of affairs previously non-existent, for, as we have already seen, the ordinary plate is more or less sensitive to all the colours of the visible spectrum if only time and intensity be sufficient.

Instead of mixing the colour sensitisers with the emulsion before the plate is coated, it may be applied by soaking the ordinary coated dry plate in an aqueous solution of the sensitising material. Or it may be applied in other ways which we need not now stay to describe. The amateur wishing to prepare his own colour sensitised plates will find the second, or bathing method convenient, as it can be readily applied to the plates with which he is already familiar. Details and formulæ for carrying this out may be found on other pages of this number.

It has been observed that if a dilute solution of the sensitising substance be put before the slit of the spectroscope it absorbs some of the spectrum colour so that the spectrum shows a partial colour band. Suppose this to fall in the green region

by way of example. Then if the green transmitting sensitising dye be applied to the plate, either by bathing or during the making of the emulsion, it will stimulate or augment the plate's sensitiveness to the same region of colour that its solution transmits in the spectrum.

**Fluorescence.** Take a clean bit of glass—say a a $\frac{1}{4}$-plate negative from which the film has been cleaned away. Coat one half the glass with black varnish and let it dry. Turn the glass over, and on the middle of the varnished half and also on the clear part, make a good-sized "blob" of red ink on the side of the glass opposite to the black varnished side. When the red ink is dry, look *through* the clear glass part and note its colour, *viz.*, red. Now, turning your back to the light, look *at* the ink blob backed up by the black varnish. It shows a greenish yellow or yellowish green colour. We thus have an instance of fluorescence, *i.e.*, a substance showing one colour by transmitted light and its complementary by reflected light. The earlier forms of dry plates were prone to show a greenish fog by reflected light and a pinkish colour by transmitted light. This was called dichroic fog.

It so happens that many, but not all of these sensitising dyes, are fluorescent, and we are therefore not surprised to find that the fluorescent colour of the dye indicates the region of the spectrum that it acts as a sensitiser. Thus, a dye solution, which by transmitted light is red, will appear green by reflected light and exalt the green sensitiveness of the plate. (See p. 41.)

**Luminosity.** This word is the key-stone of the subject of this number of *The Practical Photographer*, and therefore the reader must spare no trouble to acquire clear ideas on this subject. This he can best do by making a few very simple, but eminently practical experiments.

First of all we must prepare a light scale, and this can most easily be prepared with the aid of a piece of bromide paper. In a half-plate size printing frame, put a piece of clear glass. Along the face of the frame gum two strips of white

paper. Divide each strip into half-inch spaces, thus giving us twelve half-inch markings. We require a piece of card the same size as the printing face of the frame, *e.g.*, 6 in. × 4¼ in. In the frame put a piece of unexposed bromide paper in the dark-room. Retire to that end of the dark-room as far as possible from the gas lamp. With the card, cover up the first half-inch strip of the face of the frame (and bromide paper), and lay a sheet of tissue paper over all. Now turn up the gas for one exact second only. Now shift the opaque card so that it is opposite the second of the half-inch markings, again cover up with tissue paper, and expose again for one second. Slide up the card to the third half-inch mark, and this time expose for two seconds. Repeat after moving the card to the fourth mark, and expose for four seconds; slide the card to the fifth mark and expose eight seconds, and so on, sliding the card forward to the next mark, and doubling the exposure, and so on till all the twelve (or rather eleven) strips have been exposed under the tissue paper.

One moment's thought will show us that the first strip had no exposure, the second strip had 1 second, the third, 1, plus 1, or 2 seconds, the fourth, 1, plus 1, plus 2, or 4 seconds, the fifth had 1, plus 1, plus 2, plus 4, or total of 8, and so on. The exposures being 0, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024 seconds. We now proceed to develop this strip until we can just see the slightest trace of difference between the unexposed first strip, and that which had 1 second. By this time the tenth, eleventh, or twelfth strip should be quite black. We now have a scale extending by even difference from black to white. This is fixed, washed, and dried in the usual way. Next we take a piece of white paper and compare it with our measuring scale, when the two are held together and viewed by light coming over our shoulder as we stand with our back to the window; let us suppose that the white paper is equal to the first strip on the scale. Now place the white paper three or four feet away from the window. Go back to the window and compare the light scale with the now slightly grey paper. Let us suppose that it matches the third strip. Now

put the paper at the further end of the room, and compare its brightness with the scale at the window. It will perhaps now be as dark as fourth or fifth strip on the scale. In this way we can (very roughly) measure the light value or relative luminosity of this same piece of white paper, as it is more or less illuminated by different quantities of light falling on it in different parts of the room. Now suppose for a moment that we give our light scale certain arbitrary values, thus:

| | | | |
|---|---|---|---|
| Unexposed strip | ... | ... | 10 units. |
| First strip (1 sec.) | ... | ... | 9 „ |
| Second strip (2 sec.) | ... | ... | 8 „ |

and so on. And suppose that our white piece of paper has been compared close to the window at 3 ft., 6 ft., 9 ft., and 12 ft. away, and that its lightness corresponded at these distances to the various shades, thus:

| | | | | | |
|---|---|---|---|---|---|
| Distance from window | 0 | 3 | 6 | 9 | 12 |
| Value on scale ... | 10 | 9 | 7½ | 5 | 3 |

Drawing two lines AB, AC at right angles to each other we mark along AB ten equal spaces. These are to represent the ten steps of the light scale. Along AC we mark equal intervals to represent the 3, 6, 9 and 12 ft. distances. Vertically over the 3 ft. mark we put a dot opposite the 9 mark on the light scale. Over the 6 ft. mark we put a dot on a level midway between the 7 and 8 light-scale mark and so on.

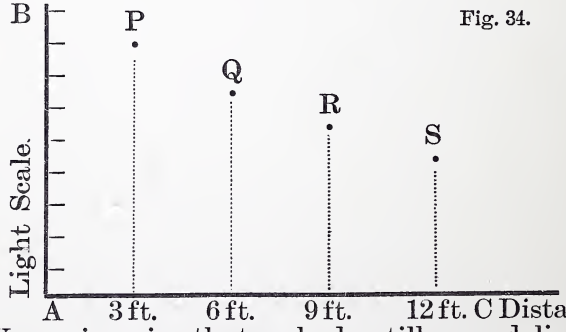



Fig. 34.

We can imagine that we had a still more delicately graduated scale and instead of taking observation at even 3 ft. distance we took them at every foot, our dots P, Q, R, S, would be more in number and

AN INTERESTING STORY.

Fig. 7 (p. 5). Harold Baker.

closer together, so that they could easily be joined by interpolating a few more dots and so formed into a dotted line or curve. This curve would then show at a glance the kind of connection which existed between the distance of the white paper from the window and its luminosity or light and shade value at that position.

Next we come to colour, and we may experiment with pieces of coloured paper or natural objects, *e.g.*, flowers, a lemon, orange, etc. Suppose we begin with a bright lemon. We must first make up our mind not to think about its colour at all, but simply consider how light or dark it is, and to do this it will be found a great help to gradually close the eyelids until all detail in the object is lost and it is only seen as a patch of coloured light. A little practice will soon enable one to ignore colour and only regard light and shade.

Having examined a lemon at various distances from the window we may then examine a full ripe orange, then a green leaf, and some blue object such as a flower, or packet of laundry blue. Our next experiment should be an attempt at comparing different colours, so as to reduce them to the same luminosity. For this purpose it is useful to have a boxful of small pieces of coloured papers. We can then pick out a shade of green which in luminosity matches a shade of red and so on. The reader will now be able to understand how it would be possible with carefully made instruments to measure the luminosity of all the various parts of the visible spectrum and so form a luminosity curve such as that shown in Fig. 33.

The practical and pictorial worker, however, should be continually comparing the relative luminosities on " tone values " of different coloured objects at various distances. He will be more and more convinced that the ordinary plate, whose version he has been hitherto accepting without discrimination or complaint, is continually falsifying values. And this knowledge will make him understand how it is that painters complain and not without grounds—that the photographic rendering is so often untrue.

Now to see one's faults is the first step in the

direction of reform. Therefore the reader who aims at truth in tone rendering will not be satisfied by any rule of thumb procedure, but will seek to acquire a cultivated and discriminative eye.

**Reflected Light.** Of course, it will be understood that any object can only reflect such light rays that fall upon it. Thus, if we view a painting in the yellowish light of ordinary gas, we fail to see many of the finer differences of colour that are observable in daylight, because the gaslight is lacking in some of the rays that are present in daylight. Hence it is not always easy to distinguish approximate shades of green and blue by gaslight. Also, in buildings furnished with windows containing coloured glass, our judgment of the colours of the objects in the rooms may be considerably at fault. Indeed, the visual effect is the same whether we view an object through a piece of coloured glass, or if the whole of the light falling on the object passes through the same coloured glass, though we are more likely to notice it in the former case.

**Colour of Daylight.** The reader must not forget that the colour of daylight may vary very considerably. From, let us say, an hour after sunrise to an hour before sunset, and in the clear air of the country, this light is white, whether it be direct sunshine or diffused by clouds. But in the neighbourhood of smoky towns it is by no means always pure white light even at high noon. Again, such familiar expressions as "rosy dawn," "golden sunset," etc., serve to remind us of the familiar fact that early morning and late evening sunlight is usually strongly tinged with colour. Indeed, this is sometimes so marked that striking orthochromatic effects can be obtained with colour sensitive plates without the use of the usual colour screen. The changing colour of the sun's face as it is sinking to rest in the evening can be illustrated by a homely experiment.

**An Artificial Sunset.** Fill any fairly sized glass vessel, such as an aquarium tank, with tap water, and then add some powdered hypo, and stir until dissolved. Now put

behind the tank any strong light, such as an incandescent gas jet, and note the colour as seen through the water. Now add a few drops of strong hydrochloric acid, and stir well. Very shortly the water will begin to show an opalescent appearance, which will presently increase, and suggest a milk and water mixture. The light, seen through this changing fluid, becomes yellow, orange and red as the turbidity increases. Now as the sun sinks lower and lower its rays have to pass through more and more thickness of atmosphere. And our atmosphere—especially in the neighbourhood of towns—has fine, floating particles in it. Our hypo solution is slowly decomposed by the acid, and sulphur in a very fine state is set free. Thus in our tank we have a kind of concentrated atmosphere, and the slowly increasing number of particles corresponding to the increasing quantity of atmosphere through which the sun's rays have to pass.

**Complementary Colours.** We have seen that white light is split up by a prism (P) into various colours, which we conveniently group as violet, blue, green, yellow, orange and red. By using a second prism (Q), put just the opposite way round, we can combine three colours and form white light again. But if between the prisms we place an opaque object (R), such as a slip of card, say, in the yellow region, we should so prevent these particular rays passing into the second

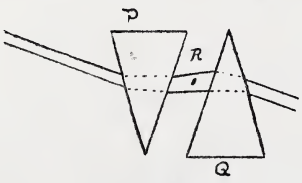



Fig. 35.

prism. The result of all the recombined rays, excepting yellow, would not be white, but blue. Similarly, if we cut out the red light the remainder would recombine to form green-blue. Thus we say that yellow and blue are complementary colours, for if combined they give white light. Similarly green and violet. Now the reader must not con-

fuse the effects of combining two transparent blue and yellow glasses and getting a green colour with combining blue and yellow light. In the former case we are only seeing those rays which get through both the glasses. In the second case we are adding blue to yellow light, but yellow light is the result of adding red and green light, so that we are really adding blue, red and green light together.

**An Experiment.** Take a piece of thin, but brightly coloured, tissue paper of, let us say, a rather dark sky-blue or violet colour. The size may be about six inches square. Roll the paper up to form a tube an inch in diameter and six inches long. A touch of gum or paste is applied here and there at the edge, so as to prevent the paper unrolling itself. Make a similar tube of opaque black paper. Seat yourself sideways and near to a well-lighted window. Pin up a sheet of white paper two or three feet away from and opposite to you, and let it be in a fairly good light. Now point the blue paper tube to that eye which is next the window, say the left; hold it so that a good strong light falls on the tube, close the right eye and direct the visual attention to a spot on the white paper. The left eye sees a white disc surrounded by the blue tube. After looking at this for, say, half a minute, bring the black paper tube up to the closed right eye, and then open it and compare the two discs of white paper as seen through the two tubes. It will be noticed that the right eye now sees not only a brighter, but also a whiter, disc, and that the disc opposite the left eye, which a moment ago seemed white, now has a decided primrose-yellow tinge. Repeat the experiment, but in place of the black paper tube use one of light bright yellow. The colour contrasts will be found to be accentuated. The probable explanation is that those nerves of the left eye which respond to or perceive blue get fatigued by the light coming through the blue paper, so that presently this band of colour practically becomes non-existent so far as that eye is concerned; but the eye is still responsive to the remaining or complementary rays which go to make up yellow light.

Fig. 8 (p. 4). Harold Baker.

THE COUNTESS
OF
WARWICK.

Ortho Plate and Colour Screen.

Fig. 9 (p. 28).

Distant Landscape.

Fig. 10 (p. 28).

Ordinary Plate.

The same experiment may be performed with a small piece of opaque brightly coloured paper, which, by way of example, may be bright red. Lay a bit about the size of a sixpenny-piece on a sheet of white paper. Mark the coloured paper at the centre with a pin's point, and concentrate the visual attention of one eye on this pin-mark, keeping the other eye closed. After one minute quickly push aside the red disc, when a green-blue patch will appear. Complementary colours which are produced by fatiguing one set of eye nerves in this way are often spoken of as "after images" or "fatigue effects."

**Contrast Effects.** At this stage of our experiment the reader may profitably refresh his memory by referring to p. 17 in No. 4 of the present series of *The Practical Photographer*, and looking at figs. 10-14 of that number. These refer to contrast of light and shade, and lie at the very root of matters pictorial. Having just ascertained by our after-image experiments that, let us say, red and green are complementary, we may apply this knowledge to the subject in hand. Take a piece of red paper and cut four equal-sized pieces, which may conveniently be the size of a shilling. We require pieces of white, black, green and orange or yellow paper. This may conveniently be about the size of a half-sheet of notepaper. Lay them side by side on a table in a good light, and in the centre of each lay the red disc, and note the following:—

(i) The red disc on the black paper looks lighter and brighter than that on the white paper.

(ii) The disc on the green paper looks redder than that on the orange or yellow paper.

From these experiments we may deduce the fact that we have in natural objects two kinds of contrasts, *viz.*, that due to colour and that due to differences of luminosity or light and shade effects.

In orthochromatic work it is the confusing of these different effects that is the cause of nine out of ten mistaken ideas. It is therefore of great importance to note that there are two kinds of contrast effect. For instance, imagine a cluster of

scarlet poppies growing at the edge of a cornfield. On one side of the red flowers we have brighter orange-yellow cornstalks, on the other side the green grass, which we may assume happens to be of equal luminosity with the red flowers. By complementary contrast the red against the green will look much brighter, *i.e.*, more eye-attracting, than the green. But the same red looks quite dull when compared with the golden cornstalks.

Speaking generally, when photographing objects of different colours, *e.g.*, flowers, clouds, landscapes, costume studies, etc., it is always necessary to be on one's guard that the eye is not misled, and confuses colour contrast with light and shade or luminosity contrast.

## How to Commence Work with Orthochromatic Plates.*

NOT a few mistakes, misunderstandings and disappointments with ortho plates result from beginning work at the wrong end, *viz.*, commencing with a difficult and complex subject like an open landscape. It is far better to familiarise oneself with what an ortho. plate will and will not do by dealing with some simple object. We recommend the ordinary yellow paper covered Bryant & May's match box as a suitably coloured object which is obtainable anywhere. As a background use a white table cloth. (This is better than white paper which may yield troublesome reflections.) The inner portion of the box provides us with a convenient patch of blue. Place the object in diffused light and photograph it first with an ordinary plate and then with a colour screen and ortho. plate. Do not form any final opinion as to these two negatives until they are printed. Such a result as shown in figs. 15 and 16 will probably be obtained. Note that with the ordinary plate, fig. 15, the blue part comes out in the print lighter than the bright yellow paper cover. But in the ortho plate, fig. 16, this contrast is reversed.

For a second experiment we recommend the

*The three-coloured cover of this number is designed as a test object.

same match box and one or two large green leaves, such as a lettuce or cabbage. This gives us white, black, yellow, blue and green.

Follow this experiment by adding a full ripe orange for the third study.

Finally add a piece of red flannel and a piece of dark brown paper for the fourth experiment.

Study these carefully and a good practical foundation will have been laid.

Then copy the colour chart, Figs. 11 and 12, *vide* Figs. 27, 28, 29, also the cover of this volume.

**Needlework, Tapestry, Etc.** Here, again, the advantage of colour-sensitive plates is often very marked. In studying the example shown in Figs. 21 and 22 the colours should be kept in mind. Surrounding the upper portion is a wreath of flowers and leaves. The leaves are various shades of green, outlined with mauve, the central top flower being a light yellow rose. The other larger flowers of the wreath are various shades of red. In the right and left lower corners certain leaves shown in Fig. 22, but scarcely seen in Fig. 21, are autumn brown. Similarly in the upper central part, the two large flowers seen in Fig. 21, but almost lost in Fig. 22, are deep crimson. Finally, the two largest flowers, which in Fig. 21 appear flat and very similar, are much more correctly rendered in Fig. 22. The background is black.

**Pottery and China.** The use of ortho plates may well be exemplified by using objects of decorated pottery or china. The best results will be obtained in a somewhat soft and diffused light, so that the reflected white light, which is always more or less present, will not interfere so markedly with the designs. In Figs. 19 and 20 we have on the left a double-handled Dutch sugar holder of white glaze and sky blue decoration. In the middle a Spanish vase, with a church in light and dark yellow. To our right an early Worcester vase, with decoration in rich, deep blue. In this vase are a few primroses. The paper-knife is of ivory. The difference between the ortho plate, Fig. 19, and the ordinary plate, Fig. 20, will easily be noticed and appreciated. In the one case the two blues are very similar, and in the other are duly marked.

**Flowers in the Garden.** In Figs. 23 and 24 we illustrate the use of ortho plates to show how misleading the ordinary plate may be. The bed in the near foreground is chiefly occupied by pale yellow tulips, which in the ordinary plate are hardly differentiated from their accompanying green leaves. Beyond them is a narrow band of pink blossoms. Towards our left is a patch of fresh bright green spring grass. The difference in the rendering of the sunlight on the young green leaves of the trees in the middle distance should also be noted. The ordinary plate has a more or less flat look, which is markedly different from the relief obtained with the ortho plate. The reader may advisedly consult our recent volume, No. 19, Floral Photography.

**Spring Foliage.** The most casual observer can scarcely have failed to notice not only the variety, but also the great delicacy, which the young spring leaves give to the half-clad trees. This gives the trees a suggestion of transparency, and idea of roundness and relief. In Figs. 13 and 14 we have the ordinary and ortho rendering of the same subject. The blue sky and white grey clouds are lost in one instance and caught in the other. Again there is a flat, all-in-one-plane, cut-out scenery look about the ordinary plate rendering, while the ortho plate gives us a far better suggestion of objects at various distances.

**Distant Landscape.** The help of the ortho plate is perhaps greatest when dealing with open landscape subjects. But to get the full advantage, and yet not exaggerate falsities as much in one way as the ordinary plate does in another, requires great care. The examples shown in Figs. 9 and 10 are not held up as copies, but rather as showing the need for very watchful care in subjects of this class. It will at once be seen that in one instance the gorse bush with its yellow flowers appears as a flat dark mass all but devoid of any roundness. The difference in the rendering of the trees in the distance is easily seen. The ordinary plate certainly exaggerates the slight evening haze, which was only just visible when the two negatives were exposed one immediately after the other.

**Ortho Plates for Portraiture.** Now that ortho plates are being made of a fairly high speed, their use in the studio for portraiture is within the range of daily practice. The windows of the studio should be as large as will serve the purpose. Thus with a moderately pale yellow 5 or 6 times screen, with ortho plates of 200 H and D, a portrait in a well-lighted studio may be obtained with an exposure of one or two seconds. With adult sitters this is not a formidably long time.

Figs. 17 and 18 show the difference between an ordinary plate and an ortho plate with yellow screen. The sitter's hair was a rich golden or ruddy auburn tint, complexion light and clear. The sitter is wearing a blouse having a design in pale pink on a pale green ground. The flowers held in the hand are pale yellow outer part, with darker yellow centres. Both negatives are entirely untouched. The chief difference is in the better rendering of the flesh and hair and flowers.

**How to Test a Colour Screen.** There are three things the practical worker needs to know about any colour screen he is using. *First*, how much it will increase the exposure. *Second*, what colours it filters out. *Third*, what effect it has on the ultra violet rays. This note is only concerned with the first of these three questions. Two cases arise, *viz.*, the use of a magazine or roll film camera, and the use of a camera and tripod, with the usual plate holders or dark slides. Taking the latter case first the procedure is as follows: Load up a double back with two ortho plates that are to be used with the colour screen which is being tested. Then, without any screen, give the first plate such an exposure that it will be slightly, but not *very* much, under-exposed. For example, suppose that an exposure of two seconds is the minimum time required for a satisfactory negative, then for testing purposes we should give one second. Then with the second plate and screen give a series of strip exposures by pushing in the shutter or slide of the plate holder about half an inch after each additional exposure. For example, suppose that we have reason to think that the

colour screen increases "4-times." Then with *same stop* as the first plate, which had one second, begin by exposing the whole of the second plate for two seconds, then push in the slide half an inch and give one second, again push in another half inch and expose one second, and so on. The second plate on development will show a strip negative in progressive exposures. The first strip had two seconds, the next two *plus* one, or three seconds, the next two *plus* one *plus* one, or four seconds, and so on. Then, on comparing these two negatives or, far better, prints from them, we can see which of the strips is most like the unscreened negative, and thus we see how many "times" the screen increases exposure.

In the case of a magazine or hand camera the procedure is slightly different. We commence by exposing one plate without any screen with a small stop, and give such an exposure that is sure to be under rather than over-exposed. Suppose this is *f*/45 and $\frac{1}{10}$th second exposure. Then putting the colour screen in position we use the next larger stop, *viz.*, *f*/32, and give *same exposure*, *viz.*, $\frac{1}{10}$th second. This is equivalent to $\frac{1}{5}$th second with *f*/45. So that the second plate had an exposure equivalent to double that of the first. The third plate again has $\frac{1}{10}$th second exposure with the next larger stop, *i.e.*, *f*/22. This, then, is getting an exposure equivalent to four times that of the first. The next plate has $\frac{1}{10}$th second with *f*/16, or eight times the first, and so on. In this case we use the same shutter speed for each separate plate, but a different stop. Then a comparison of the prints will show which screen negative is nearest to that made without a screen, and so give us the increase ratio of the screen.

Fig. 25 is from a set of exposures made to test the time-increase of a screen which had been variously stated to be 5 and also 10 times. The shutter was set for $\frac{1}{8}$th second for all the exposures. We may best see how matters stand by the subjoined table :—

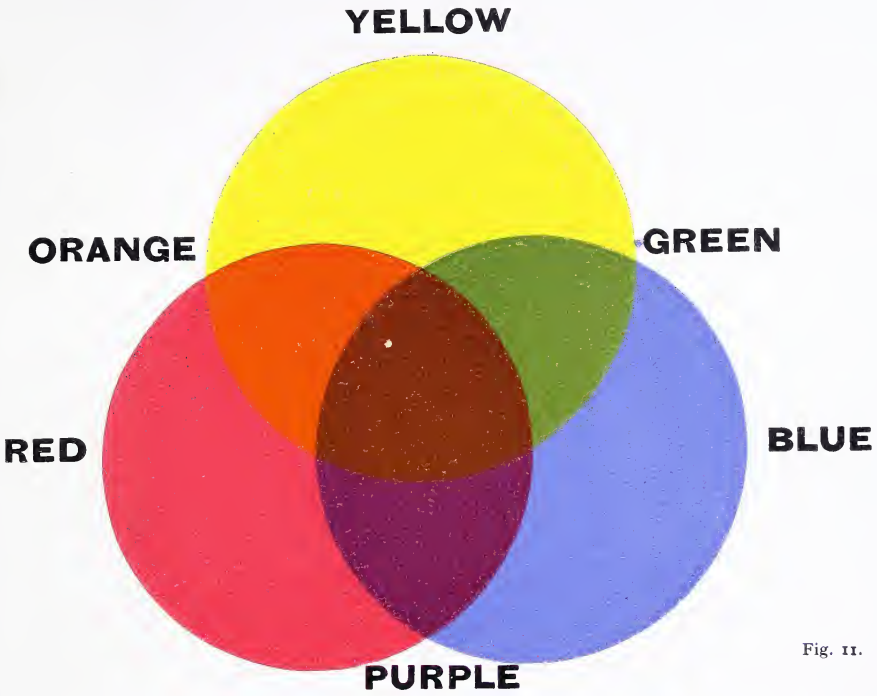



Fig. 11.

When photographing this Test Chart, place it in good diffused day light, but not in direct sunshine.

Fig. 12

Fig. 25. Exposures in all cases $\frac{1}{8}$ second.

| | | | | |
|---|---|---|---|---|
| A. | *f*/45. | No Screen. | | |
| B. | *f*/32. | Screen. | Equivalent to 2 | times A. |
| C. | *f*/22. | ,, | ,, 4 | ,, |
| D. | *f*/16. | ,, | ,, 8 | ,, |
| E. | *f*/11. | ,, | ,, 16 | ,, |
| F. | *f*/8. | ,, | ,, 32 | ,, |

On comparison we find that A had rather more exposure than C and not so much as D, *i.e.*, the screen increased the exposure something between 4 and 8 times. Further trials showed it to be practically a six-times screen.

This series of trials also shows us that with this screen, plate, and light, $\frac{1}{8}$th second with *f*/8 is not over-exposed.

It should be remembered that this or any other colour screen which requires an increase of six times with this plate, may require more or less than six with other brands of plates which are less or more sensitive to the rays which this screen transmits.

**Displacement of the Image by the Colour Screen.**

The reader may be reminded that when a ray of light AB falls upon a plate of glass, it is refracted on entering the glass along BC, and on emerging is again refracted along CD, so that CD is parallel with AB. Without troubling for

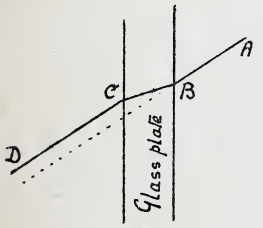



Fig. 36.

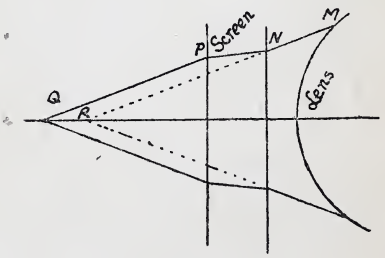



Fig. 37.

the moment with mathematical formulæ, one can see at a glance that the thicker the glass the more the ray is shifted parallel to itself. If then we place a sheet of glass between the lens and the plate, the image will not now fall in the same

place as it would had the plate not been there. In fig. 37 we have a very exaggerated diagram showing a very thick screen between the lens and the plate. Had there been no screen present, the ray MN on emerging from the lens would have cut the optic axis at R. But if it fall on the glass plate or screen at N it would be refracted along NP and again refracted along PQ, thus displacing the focal image through a distance QR.

Now if we know the refractive index $\mu$ of the screen and its thickness $t$, it is an easy matter to show that the displacement QR equals $t\ (1—\frac{1}{\mu})$. By way of example we may suppose the refractive index from air to glass to be 1·5 or $\frac{3}{2}$ and imagine the thickness of the screen to be $\frac{1}{8}$ inch. Then the displacement QR becomes $\frac{1}{8}\ (1—\frac{2}{3})$ or $\frac{1}{24}$ inch. From this we see the necessity of adjusting the focus with the screen in position when it is placed between the lens and the plate.

**How to Make a Drying Cupboard.** The two things required are exclusion of light, and a full current of air. It is a further convenience if the cupboard is small enough to be portable so that it may be taken from one room to another.

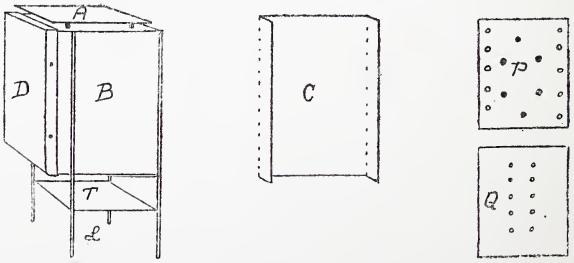



Fig. 38.

Fig. 38 shows the general idea of a form which can be easily constructed by anyone with a moderate amount of patience. The materials

wanted are some nine or ten fairly large sheets of stout mill or straw board, four wooden laths, a sheet of tin, brown paper, black tacks, paste, and a knife. The apparatus consists of a box B, which stands on four legs, the lid-like door is shown at D.

The box is made of five pieces of card with the edges folded at right angles as shown at C. The folded overlapping edge is fixed to its neighbour by means of black tacks at intervals of about 3 inches. Before commencing the large box it will save time if a small model be made just to show how the various folds are arranged, so that the edge folds are alternately horizontal and vertical. The lath legs are nailed to the outside of the box. P shows the bottom of the box with a row of circular holes about the size of a sixpence cut along each edge. To the bottom we glue six wine corks shown as black dots surrounding P. On these corks—all of the same size and height—rests another bottom piece Q, in which are two rows of holes down the centre. On the inner bottom Q rests the drying rack for the plates. In the centre of the lid are cut about half a dozen holes. Four corks are glued to the outside of the lid, and on them rests another piece of card. T is a piece of tin nailed to the four legs about 3 or 4 inches below the bottom of the box. The door D is made so as to have a projecting edge all the way round, just like any ordinary cardboard box lid, to prevent it falling off. Two stout pins are inserted through each side of the lid and box (shown as dots). The plates to be dried are placed as far apart from each other as the rack will allow—or they may be laid on edge in Q and rested against the sides of the box—film side towards centre of box. The lid is then put on and fixed with the pins. Then a night light is put in a soup plate with $\frac{1}{4}$ inch of water, lighted and put on the floor at L below the tin shelf. The night-light heats T, which causes air to rise and enter the holes in P, and so through those is Q and out at the top. The box should be lined with black paper pasted all round the inside. Before use it should be left—open—before the kitchen stove all night.

# Orthochromatic Photography in Theory and Practice.

By T. THORNE BAKER, F.C.S., F.R.P.S.

IT will be our endeavour in the following pages to make quite clear to our readers the necessity for orthochromatic plates, the essential points to be observed in their use, and the ways and means by which a successful and advantageous practical knowledge of the subject can be obtained.

The whole difficulty with the now old-fashioned ordinary form of dry plate is that it is partly colour-blind; it does not recognise the colours in Nature as does the human eye, and in consequence our photograph is an entirely inadequate and incorrect reproduction of any brilliant colours, or indeed colours of any kind.

It is an axiom, for instance, that a red dress "comes out" black in a photograph, a blue sky comes out dead white, and so on. The rôle of the orthochromatic plate and screen is to remedy this, so that we have in all photographs a representation of the original subject in which every coloured object appears in a shade of grey, or "monochrome," corresponding as regards density to the visual brilliance of that colour.

**Colour.** It will be as well to remember that white light as we get it from the sun is made up of rays of coloured light, as may very easily be proved by allowing a beam of white light to fall upon a glass prism. Rays of different colours are bent out of their course to a different extent during their passage through the prism, so that a band of coloured rays emerges from the opposite face, this band being called the *spectrum*.

**The Spectrum.** But the eye can only perceive the band which begins with violet, passes through blue, green, yellow, orange and ends with red.

Not so the photographic plate, however. Beyond the violet there is another series of rays, quite invisible to our eyes, embracing what have been termed the ultra-violet rays, whilst beyond the red

there are more rays, also invisible, known as the infra-red rays.

**Effect of Light.** Now, it is hardly necessary to point out here that the light which passes through the lens and reaches the dry plate or film produces a *chemical change*, or what is probably more correctly a physico-chemical change of state of the silver haloids. This change which light effects enables the developer to reduce the "image" to metallic silver. Rays of every colour, then, have some chemical power, but the colours which are most powerful chemically are the ultra-violet, violet and blue, while the green, yellow, orange and red scarcely affect the dry-plate emulsion at all.

**Reflected Light.** Another point of importance in photographic work is that from the surface of nearly every object some white light is reflected. (Thus glazed paper is considered undesirable for printing, as it tries the eyes when reading owing to reflected light; similarly from the surfaces of leaves, grass, water, flowers, pictures and so on some white light is almost invariably reflected.) Now, this reflected white light naturally contains its own share of ultra-violet and violet rays, so that often a red object will affect the plate and not seem abnormally "black" in the print, because the white light reflected from its surface has produced its own effect on the film.

**The Prism.** Going back again to the prism, we found that a beam or streak of light which passes in at one face of it emerges from the other as a band of colours. Thus in Fig. 39 a beam of light W strikes the face of the prism, and if we place a screen S on the opposite side we can get a spectrum R V upon it, the red end being at R and the violet at V. It is obvious from this that the red rays are bent least out of their course, the violet most. Between R and V we find every shade of pure colour in Nature, and by mixing various proportions of these pure colours, and introducing white or black, we could produce any tint imaginable.

Fig. 39.

**Ortho-Iso-chromatic.** The word orthochromatic means "correct as regards colour," in the broad acceptation of the term, and an orthochromatic is therefore a plate which is sensitive to all colours just as the human eye is. The term isochromatic is an altogether faulty one, meaning practically "equally sensitive to all colours," and a plate equally sensitive to the whole spectrum is not an ideal one, for the following reason:—

Suppose we laid on a table with a white cloth five bunches of flowers and a bunch of grass. Imagine a bunch of violets on the white cloth, and next it a bunch of lobelias, then a handful of fresh grass, then a bunch of daffodils, then a bunch of marigolds, and lastly a bunch of deep scarlet geraniums. Asked what attracted your eye as being the most luminous or "bright" objects on the table, you would at once say the white cloth, and next to it the bunch of yellow daffodils. A little further consideration would lead you to admit that the grass and the marigolds seemed of about the same brightness, and then the blue and red, and lastly the violet flowers. Clearly, then, each colour has its own specific brightness, and on looking at the spectrum (through a pocket spectroscope, for example) it would be found that yellow was the most luminous colour visually, and then orange and green, next blue and red, and lastly violet. Hence the dry plate, to be *orthochromatic*, must be most highly sensitive to yellow rays of light, more sensitive to green and orange than to blue or red, and least sensitive of all to violet. But the ordinary dry plate is chiefly sensitive to ultra-violet, violet and blue rays, hardly sensitive to green, and practically insensitive to any of the other colours, including the visually luminous yellow.

**Ortho-chromatising.** Can the plate be rendered truly orthochromatic? The answer to this is "No, not by itself." Plates can be rendered sensitive to some extent to green, yellow, orange and red, but in order to reduce the actinism of the violet rays a "filter or "orthochromatic screen" is also required.

**Dyes.** Certain aniline dyes have the very remarkable property of conferring

Ortho Plate and Colour Screen.

Fig. 13 (p. 28).

Spring Landscape.

Fig. 14 (p. 28).

Ordinary Plate.

Ortho Plate and Colour Screen.

Fig. 15 (p. 26).

Yellow and Blue Match Box.

Fig. 16 (p. 26).

Ordinary Plate.

colour-sensitiveness upon the emulsion with which dry plates are coated. Thus, although an ordinary plate is only sensitive to violet and blue, by bathing it in a solution of certain dyes we can *extend* this sensitiveness to every other visible colour in the spectrum. The whole secret of the orthochromatic plate rests on this remarkable power of aniline dyes, though the precise action of any dye is not at all accurately known at present.

**Contact Screen.** It has been shown, for example, that if a thin transparent film be dyed with the aniline colour in question, and this film placed in contact with the film of an ordinary plate, as long as the dyed film or screen *is* in contact the plate itself will be just as colour-sensitive as if the dye had been mixed with the emulsion.

**Ammonia.** A point of extraordinary interest in connection with dyes is that if a ready-prepared plate be bathed in an ammoniacal solution of a certain dye, very considerably greater colour-sensitiveness will be imparted to it than if the dye had been added to the emulsion with which the plate was coated.

**Fluorescent Dyes.** Another interesting point is that the dyes like eosin, erythrosin, rose Bengal, &c., which are fluorescent, exert quite a different action from those which do not fluoresce, but to this we shall refer again at a later period.

**Colour-sensitiveness.** It must be understood, then, that by slightly colouring the film of an ordinary plate with certain aniline dyes, colour-sensitiveness can be imparted to that plate. If we look at the diagram of three coloured over-lapping circles, etc., Fig. 11, 12, we may consider the following:—Ordinary plates are only sensitive to blue and violet, and if, therefore, we photographed these coloured circles on an ordinary plate, only the blue one would "come out." The majority of the so-called orthochromatic plates are violet, blue, green and yellow-sensitive, and on such plates the blue and yellow circles would come out. The so-called panchromatic plates, or "total-spectrum-sensitive" plates, are sensitive to all the colours the eye knows, and on these plates all three circles would be represented.

But though sensitiveness to various colours can be imparted to dry plates, it is only in a very inadequate degree, and the powerful violet rays of sunlight still produce very much greater effect. More than this, the orthochromatic plate, in order to fulfil its purpose completely, must be sensitive to all colours according as the healthy eye sees them. Consequently, not only must some means be adopted to prevent the invisible ultra-violet rays from reaching the plate during exposure, but other steps again must be taken in order to "damp" or "enhance" each colour so that its effect upon the plate will be commensurate with the visual brightness. The plate must be made to "regard" yellow as the brightest colour, violet as the darkest, and so on, so that if one were to photograph a bunch of daffodils against a dark-blue background, the flowers would appear very light in the print, and the background very dark.

**Spectrum Camera.**

In fig. 26 we have in diagram form a spectroscope, consisting of a telescope A, which concentrates the rays of light from some source of illumination L and casts them on a prism P. A slit is placed on the front of A in order that a thin beam of light with parallel sides falls on the face of the prism. B is another telescope which embraces the spectral band of colours emerging from the prism; and instead of looking through B with the eye, we can place a dry plate in the position CD so that the spectrum falls upon it. This may done by adjusting an ordinary spectroscope and attaching a camera to the viewing telescope B. By exposing a plate in the camera and developing it, we shall learn in what manner the band of colours will be represented. The prints from negatives so obtained of the spectrum, taken on an ordinary, an orthochromatic, and a panchromatic plate, are shown as E, F, G respectively.

We see from E that the ordinary plate only records the violet and blue rays, and a little of the green. The "orthochromatic" plate records green and yellow also, but not red. The panchromatic plate, on the other hand, records fairly evenly the whole visible spectrum. F was a plate bathed

with erythrosin in the way described at a latter page; G was a plate bathed with homocol, an aniline dye of the cyanin class.

Various makes of plates give very different renderings of the spectrum, many of them showing a gap in the green region, which, of course, means lack of green-sensitiveness. If the density of consecutive equal portions of the negative be read off, a curve can be plotted, showing the precise colour sensitiveness of any plate. Suffice it to say that most of the plates on the market termed ortho- or iso-chromatic are of the type obtained by bathing an ordinary plate with erythrosin, whilst "panchromatic" or "red-sensitive" plates are similar to these, except that they exhibit a further sensitiveness to the orange and red regions of the spectrum.

**Dyes.**

We give below a list of dyes useful for sensitising.

| | |
|---|---|
| Green Sensitisers. | Auracin; thiazol-yellow; |
| Greenish-yellow Sensitisers. | Eosin; erythrosin; rose Bengal; rose des Alpes; rhodamin; |
| Orange Sensitisers. | Chinolin red; orthochrom T (this sensitises for green also). |
| Red Sensitisers. | Cyanin blue; Pluto black; pinachrome; homocol (the two last sensitise for green also). |

**The Colour Filter.**

The next point of importance is the orthochromatic screen or colour filter. The first essential of the screen is that it destroys the ultra-violet rays, which, being invisible to the eye, therefore must not be recorded on the plate. Certain yellow dyes are used for this purpose, as we shall explain later. The next function which the orthochromatic screen must perform is to cause all rays of light of *low* visual intensity to act only slightly on the plate, and to enable rays of *high* visual brightness to act intensely. This is brought about by making the screen of such colour that it only allows rays of light to pass through it which will bring about this result. Thus, yellow being the "brightest" colour, the screen must permit more yellow rays to pass than any other; violet being the least bright, the screen must allow less violet to pass than any other, and so on.

Look for a moment at the coloured diagram again. Hold a piece of yellow glass in front of the eyes and examine the coloured circles. The blue circle will appear very dark, the yellow extremely light. On photographing this coloured "chart," the negative should give the blue circle as a light grey, the yellow as an almost black circle. But if we use an ordinary plate, *just the reverse will be the case.* If now an orthochromatic plate be used with which to photograph the chart, very little difference will be noticeable, because of the white light reflected from the surface of the paper. If, however, a yellow screen be placed in front of the lens, and an orthochromatic plate be employed, the blue circle will appear light grey and the yellow circle very dark grey in the negative; the blue circle coming out dark and the yellow circle almost white in the print.

What about the red circle? Well, this is just the one point in which ordinary so-called orthochromatic photography fails. Unless the colour-sensitive plate be *red-sensitive*, we cannot expect it to reproduce reds and sepias, and any colours containing reds in their true values in monochrome. As will be seen on taking a photograph with a green-yellow sensitive orthochromatic plate and screen, the red will still come out much too dark. But if we use a panchromatic plate, and employ a dark yellow screen, we shall readily obtain a correct rendering of all three circles. These circles being approximately representative of the so-called primary colours, they make an excellent test subject for adapting screens to plates.

**Types of Plates.** The general rule is to use erythrosin-type plates for landscape work, and this is really all they are suitable for. When photographing flowers, pictures, still-life subjects, and portraits, a plate sensitive to the whole spectrum is infinitely superior. For studio work and copying, a coloured solution is very useful, as it may be used in a glass cell fixed in front of the lens, and adapted to any special work. Thus, if we had to photograph an engineer's plan made on ferroprussiate paper, the blue and white would give a very flat result on an

ordinary plate; but by using a weak solution of potassium chromate in the cell, and an orthochromatic plate, we could readily obtain a contrasty copy of the plan.

The following table may be useful for occasional reference :—

| Subject. | Colour of Screen Necessary. | Plate. |
|---|---|---|
| Clouds | Light yellow | Ordinary or orthochromatic |
| Landscapes | Yellow | Green sensitive or "orthochromatic" |
| Foliage in Spring and Autumn | Orange | Panchromatic |
| Portraiture | Light orange | Panchromatic |
| Flower studies, Copying, &c. | Deep orange | Orthochromatic |
| | Yellow | Panchromatic |

**Bath Sensitising.** We now come to the actual methods of bathing ordinary plates in order to render them sensitive to green, yellow and red rays. The fluorescent dyes, of which erythrosin is a good example, incite sensitiveness to their complementary colours, so that a pink dye "sensitises" for green rays; those non-fluorescent dyes which exert any noticeable sensitising action—and all do not—sensitise in an entirely different way: ethyl cyanin, for example, absorbs the yellowish-green rays, and these are just the rays to which it does *not* render emulsion sensitive. The plate, therefore, being originally sensitive to blue and violet, in order to render it sensitive to the whole spectrum, we must choose either a fluorescent dye whose solution transmits blue and violet rays, or a non-fluorescent dye whose solution transmits green, yellow and red rays; a mixture of a yellow and a greenish violet dye will fulfil these conditions as nearly as possible.

The ordinary "Orthochromatic" plate is an erythrosin-type plate, and may be prepared by bathing ordinary plates in a solution as follows:

| | | |
|---|---|---|
| A. | Erythrosin | 1 grain. |
| | Alcohol | 1 drachm. |
| | Water | 20 ounces. |
| | Ammonia (10% solution) | 1 ounce. |

This should be made up a day before use, and then filtered; it is sufficient for two dozen quarter-plates.

In order to have the erythrosin bath ready at any moment, it is more satisfactory to mix portions of two solutions as follows:

| | | |
|---|---|---|
| (i.) | Erythrosin | 10 grains. |
| | Methylated spirit | 4 ounces. |
| (ii.) | Ammonia (·880) | 1 drachm. |
| | Water | 25 ounces. |

For use, add half an ounce of (i.) to the whole bulk of (ii.).

Three things, at least, must be borne in mind in reference to bathing plates, if complete success is to attend the operations. The weak solutions of aniline dyes are extremely susceptible to dust and dirt of any kind, hence great cleanliness must be observed; if we are going to work with quarter-plates, it is the best plan to use a whole-plate dish and bathe four at a time; with half-plates, two may be done at a time in a 10×8 dish; these dishes should be of glass or porcelain, and kept scrupulously clean. (It is sometimes recommended to use a grooved trough, such as is employed for washing or stand development, but great trouble then arises from bubbles and uneven staining.)

The next essential is always to use slow plates, preferably of about 60 H. and D. speed (pyro-soda). Rapid plates always have a tendency to be foggy, no matter how cleanly they work, and any fogginess in the original plate is enormously increased by the bathing, especially where ammonia is used or red-sensitiveness conferred.

**Drying.** The third thing to remember is that a well-ventilated and warm room is desirable for drying the plates after bathing. The quicker the drying, the better the result. If many plates are to be bathed, a hot-water pipe or steam pipe is invaluable for warming the dark-room. The dark-room, again, is not ideal for drying the plates; some dry, airy and perfectly dark room or cupboard is really better, as chemical fumes, metol dust, etc., etc., often exist in the dark-room proper and deteriorate the results.

The plates should be placed in the dish—film upwards, of course—and the dye solution poured over them; the dish must then be rocked, and at

ORDINARY PLATE.

Fig. 17 (p. 29)

ORTHO PLATE AND COLOUR SCREEN.

Fig. 18 (p. 29).

PORTRAIT STUDY.

Fig. 19 (p. 27). ORTHO PLATE AND COLOUR SCREEN.

POTTERY AND FLOWERS.

Fig. 20 (p. 27). ORDINARY PLATE.

once covered over with the lid of a cardboard box which will fit it comfortably. This is done in as little deep ruby light as possible, and the dish is gently rocked for three minutes. Sufficient only of the solution having been used for the "area" of plates in the dish, it is poured away, and the plates are then washed in the dish, in running water, for a further three minutes, after which time they are placed in a rack to drain and dry. If running water be not available, at least six or eight changes should be given.

**Uniformity.** One thing to aim at in bathing plates is uniformity. Therefore, do not bathe one plate for two and a half minutes and the next for three minutes. Similarly the washing given should always be the same; *e.g.*, if running tap water be used, it should be allowed to run at the same rate the whole time.

**Keeping.** Bathed plates will not keep so well as ordinary plates, nor as the commercial orthochromatic plates, which now-a-days are possessed of excellent keeping qualities. Plates which it is desired to keep after bathing should be very well packed in two or three thicknesses of brown or red paper, and stored in a cool, dry place which is not exposed to great variations in temperature. If the ammonia be omitted from the bathing solution, much better keeping qualities will result, but the sensitising action of the dye will not be nearly so great, and less evenly distributed.

**Sensitisers.** Eosin (blue shade), rhodamin and rose Bengal may be mentioned as being good sensitisers for the yellow-green rays. They may all be used in the same proportions as those already given for erythrosin.

A good sensitising bath for the green rays is as follows:

| | |
|---|---|
| Auracin | 1 grain. |
| Boiling water | 10 ounces. |

When cold filter, and add thirty drops of ammonia.

Next come the baths which confer orange and red sensitiveness, in using which we need hardly remark that extra precautions must be taken against light fog. One of the best dyes to use is

ethyl cyanin, and a solution may be prepared as follows:

| | |
|---|---|
| Ethyl cyanin | 1 grain. |
| Rectified spirit | 2 ounces. |

Of this solution take one drachm, add it to six ounces of water, then add half a drachm of strong ammonia. Allow it to stand for ten minutes, then filter it. This will be sufficient for about six or eight quarter plates.

The plates are thus rendered powerfully sensitive to red and orange rays, but comparatively insensitive to greenish-yellow (the sensitiveness conferred is, as a matter of fact, almost identical with the absorption spectrum of a weak solution of the dye).

Lastly, we must consider the dyes which produce comparatively even sensitiveness to the whole visible spectrum, such as pinachrome, homocol, orthochrom T. The last-named is a very good dye, but does not sensitise so well for red as the others named. Both these should be used in the proportions given for ethyl cyanin, but we cannot help recommending the omission of the ammonia, unless the bathed plates are to be used within a day or two.

When experimenting with any dye, new or old, to examine its sensitising properties, it is our practice to dissolve one part of it in five hundred parts of spirit or water, and to use one part of the resulting solution with twenty-five, fifty, and a hundred parts of water for the bathing—with and without ammonia. The six plates thus prepared, when tested in the spectroscopic cameras, give a good idea of the use and properties of the dye under consideration.

**The Erythrosin-Silver Method.** Those who want to produce a plate extremely sensitive to greenish-yellow rays—so sensitive that no yellow screen is necessary—should try the method of bathing ordinary plates with a mixture of erythrosin and silver nitrate. The most extraordinary colour sensitiveness can be obtained in this way. Three solutions are required, as follows:—

| | | |
|---|---|---|
| A. | Erythrosin | 10 grains. |
| | Distilled water | 10 ounces. |
| B. | Ammonia (·880) | 1 ounce. |
| | Distilled water | 9 ounces. |
| C. | Silver nitrate | 10 grains. |
| | Distilled water | 10 ounces. |

To make the sensitising bath take ten ounces of distilled water, add two ounces of A, one ounce of B, and four ounces of C. Filter before use. Allow the plates, which should be of a slow variety, to soak in this (in deep ruby light) for two minutes, then rinse them thoroughly in running water and place them to dry in a clean rack and in a warm, dry room.

Plates so sensitised will not keep for more than a few days, so no more than are required for immediate use should be bathed. Without screen they will give a marked improvement in most cases, but with a light yellow screen they will give a splendid orthochromatic result in about twice the normal time of exposure.

**The Colour Sensitive Emulsion.**

The reader will gather from the sections dealing with the bathing of plates that the merest trace of certain dyes in the film causes the silver bromide, or, broadly speaking, the plate itself, to be affected by rays of various colours. When once orthochromatic photography is taken up in earnest, the sensitising action of dyes assumes a position of extraordinary interest, and in order to throw some light on the actual working of the dyes, we propose to go briefly over the making of an ordinary and a colour sensitive emulsion.

When dyes are added to a gelatino-bromide or collodio-bromide emulsion, they stain the colloid or collodion around each granule of silver bromide, but it is probable that they do not enter into combination with the silver salt. That they may do to a very small extent is *possible*, because when added at an earlier stage in the manufacture of an emulsion they produce more marked effects. All these remarks are general, and there are, of course, many exceptions.

If we look at any text-book on photographic chemistry, we shall find that a plate emulsion is made by emulsifying a solution of silver nitrate with a solution containing a *little* gelatine and the requisite quantity of potassium or other bromide.

A much larger quantity of gelatine is eventually added, and the emulsion is then allowed to set into a solid jelly, squeezed through canvas, washed in water, remelted, and coated upon the glass. Thus we might make a solution of sixty grains of silver nitrate in an ounce of water, and convert it into ammonio-nitrate of silver by the addition of one drachm of ammonia (·880); this we will call A. Another solution, B, would have to be made by dissolving fifty grains of potassium bromide and two of potassium iodide in an ounce of water, together with thirty grains of Nelson's No. 1 gelatine. These two solutions—A and B—must then be heated to about 150° Fahr., and in the dark-room A added to B, preferably in a large bottle, so that between each small addition of A a vigorous shake-up can be given. We shall then have an emulsion, which, before completion, would still require another drachm of gelatine (Nelson's X opaque would answer well), in order to render it sufficiently thick.

Here comes the difference between the orthochromatic and other kinds of emulsion. According to the now historic patent of Tailfer and Clayton (1882-3), the addition of a small quantity of an ammoniacal solution of eosin to the freshly emulsified mixture in its "thin" state will render the ultimate plates intensely sensitive to the greenish-yellow rays.

Thus in our emulsion as above detailed we should add about three drachms of a 1·200 alcoholic solution of eosin, plus one drachm of concentrated ammonia; *then* add the further drachm of X opaque gelatine, and allow the emulsion to set.

It is hardly necessary to observe that all the above operations subsequent to and including the emulsification must be carried out in subdued ruby light. The emulsion, when set to a jelly, is "turned out," and squeezed into little worms through a piece of washed fibreless canvas. These worms are washed in ten or twelve changes of water, well drained and remelted. The emulsion is coated on perfectly clean glass, at a temperature of about 95° Fahr.

If two emulsions be made side by side as above outlined, one without and one with the eosin, and a few plates coated with each, although no great speed will be obtainable, the colour-sensitiveness of the eosin emulsion can be readily proved by exposing the plates in a sensitometer or in a spectroscopic camera.

**Sensitometer.** A rough colour sensitometer can easily be prepared by taking two pieces of glass, each $3\frac{1}{4} \times 2\frac{1}{8}$ in. in size, one dark blue and the other deep orange, and placing them in a quarter-plate printing frame side by side. An ordinary plate exposed under this "colour negative" to candle light at a distance of two feet for five seconds, and then developed for about five minutes in pyro-soda and fixed, will show one half of the negative black (that exposed under the blue glass), and the other half will be light grey or even white. If an orthochromatic plate be exposed in a similar way and developed, it will be found that the *orange* part has been more affected, and is blacker than the half exposed under the *blue* glass.

**The Isochromatic Screen.** We have learnt now that ordinary plates are only affected by ultra-violet, violet and blue rays of light, but that by dyeing the emulsion with which the plates are coated their sensitiveness can be extended to green, yellow and red rays as well. The sensitiveness of all plates, however, ordinary or ortho-chromatic, is so extremely great to ultra-violet and violet, that unless some measures be adopted to reduce it, the added colour sensitiveness possessed by the ortho-chromatic plates will be of very little value. Hence in front of the plate, or more generally in front of the lens, is placed a piece of coloured glass through which the rays of light must pass before they reach the film, and this glass—which is termed a screen or filter—must possess the property of destroying the ultra-violet rays, and "damping" violet and blue rays. The isochromatic screen or filter must also possess the further property of *compensating* for the deficiences

of the plate. Thus, suppose that on examination of our orthochromatic plate in the spectroscope-camera we find that it is fairly evenly sensitive to blue, orange and red, but comparatively insensitive to green, obviously, then, our filter must allow *more* gren light to pass through than either of the other colours, in order to make up for lack of green-sensitiveness.

The first essential of the isochromatic screen is that it be *yellow*, for the reason we will endeavour to explain thus.—If you hold in front of your eye a piece of blue glass, you will see nothing but blue; but if now you place in front of the blue glass a piece of yellow or orange glass, and look through the combination, you will find that scarcely any light at all reaches the eye. Clearly, then, blue neutralises yellow, or is "complementary" to it; similarly green is complementary to pink, red to bluish-green, and so on. In order, therefore, to destroy, or partially destroy, the excessively actinic blue-violet rays of light, we must employ a yellow screen, and according to the depth of the yellow the exposure necessary will be increased. The reason for abnormally darkening the violet and blue rays has already been explained.

Here comes the danger of over-correction. Too dark a yellow will give us photographs in which the yellows appear white, whilst in reality they should appear light grey. Nothing is white in Nature, and consequently if any portions of our pictures appear white we shall know that the screen used is too deep in colour for the particular plate. It will be readily understood that those brands of plate which are particularly sensitive to yellow require a lighter screen than those which only possess slight yellow sensitiveness. A yellow filter will never give correct rendering of the reds with a yellow-green sensitive plate, but only with a panchromatic or red-sensitive plate; therefore in order to obtain a perfect rendering of coloured objects it is essential to employ panchromatic plates—and an orange screen.

Rough and ready screens, very useful for general

ORDINARY PLATE.

Fig. 21 (p. 27).

RED SENSITIVE AND COLOUR SCREEN.

Fig. 22 (p. 72).

NEEDLEWORK.

Ortho Plate and Colour Screen.

Fig. 23 (p. 28).

Yellow Tulips.

Fig. 24 (p. 28).

Ordinary Plate.

work, may be prepared by staining the film of a fixed-out lantern plate, but for accurate work it is advisable to use thin patent plate glass, carefully cleaned, and coated fairly thickly with an eight per cent solution of Nelson's No. 1 gelatine or some similar soft gelatine, such as Simeon's No. 1.

A few lantern slides may be fixed and thoroughly washed, for experimental purposes, as these will supply us with gelatine-coated glasses, which may easily be dyed any colour we may desire.

It must be pointed out once for all that it is impossible to adapt a filter accurately to any make of orthochromatic plate without special apparatus, and that although we shall be able to prepare yellow or orange screens which will give very fair results, no guarantee can be given that those results will be absolutely correct.

The most useful isochromatic screen for general work, *i.e.*, landscape work and flower studies, is a yellow one, which will necessitate an increase in the exposure of about ten times. For the sake of gaining information, however, we strongly recommend making about three screens, of varying depth, to increase the exposure perhaps five, ten and fifteen times respectively, and a fourth screen of a reddish-yellow, which will raise the exposure some thirty to fifty times.

The first three may be made by soaking the fixed-out lantern plates or gelatine-coated glass for varying times in a solution of

| | |
|---|---|
| Napthol yellow | 1 part. |
| Water | 100 parts. |

This solution should be made up some hours before use and filtered. The gelatine will become stained to a light lemon-yellow colour in about ten minutes, and the screen should then be removed, rinsed in clean water, and placed in a warm room to dry. The two others should be stained for, say, thirty minutes and one hour.

The reddish-yellow screen (which is for use with a panchromatic plate, and intended to give *full* orthochromatic results, including red and sepia renderings, etc.) is made by soaking the coated

glass in the same solution, to which from a quarter to half a part of Rose Bengal has been added; or a strong solution of Aurantia may be used instead.

The screens, when dry, should be bound up with a cover-glass just like a lantern-slide, in order to protect the gelatine from scratches; but previous to binding up, both screen and cover-glass should be cut to the size required; thus for most half-plate lenses a screen two inches square is the most convenient size, and for quarter-plate lenses about $1\frac{5}{8}$ in. square is usual.

**Collodion Screens.** Another method of making the screens is to coat glass with a thin solution of collodion, which has previously been dyed by adding to it some colour soluble in alcohol and ether. When this method is adopted, it should be made a matter of practice to allow a definite quantity of collodion for each unit of area, as otherwise no systematic experiments can be made. If the coating can be carried out without waviness resulting in the collodion film—and this is merely a matter which careful practice will decide—the screens will be clearer and slightly more luminous than those prepared with gelatine.

**Collodion Colour Filters.** Light filters made with collodion are preferable to those made with gelatine in some respects. It may, therefore, be of interest to describe briefly the *modus operandi*. As in the case of gelatine filters, it is essential for the best work that perfectly flat glass, free from defects, be employed, otherwise distortion of image may result. Thin patent plate is made so well nowadays that it is almost equal to optically worked glass for colour filter purposes, and a convenient size to order is four inches square, the glass being of such thickness that about fourteen or sixteen sheets go to the inch. The glass should be carefully cleaned on both sides, either with an acid solution of potassium bichromate, or first with strong caustic soda and finally weak hydrochloric acid, distilled water being used last of all in any case.

An edging solution will also be necessary,—made by dissolving a little pure rubber in benzole,—and also a solution of iodine in alcohol, which may be prepared by allowing two or three small crystals of iodine to remain in two ounces of rectified spirit uutil dissolved.

The collodion solution may be bought already prepared, or it may be made by dissolving a little gun-cotton (pyroxylin) in a mixture of

| | |
|---|---|
| Rectified spirit | 5 parts |
| Ether (·720) | 7 parts |

until a thin solution of about the consistency of milk is obtained. To a portion of the thin collodion must be added sufficient dye to make the coated glass when dry of the requisite depth in colour—and obviously no fixed proportions can be laid down for this.

Picric acid is a dye soluble in collodion, which may be successfully employed, and screens made with it answer very well for landscape work with plates of the erythrosin type. Enough dye should be added to, and well shaken up with, the collodion to make it of a light lemon yellow colour when a little is poured upon glass and examined by transmitted light.

Now for the actual coating of the clean patent plate. Each glass before being coated must be further cleaned by having a little iodine solution poured on the side to be coated, and wiped all over the surface with a piece of fibreless tissue or filter paper until quite dry. With a fine paint-brush a thin edging of the rubber solution is now applied to the cleaned side, making a kind of "safe-edge" of about an eighth of an inch depth. The glass is then attached to a pneumatic holder, which is held in the left hand, while a pool of dyed collodion is poured on to the clean side, in the centre. By tilting the glass in all directions it soon becomes completely covered, and the surplus collodion is then poured off back into the bottle, the coated glass being gently rocked *sideways* to prevent waviness in the film while drying. When no more collodion leaves the glass it should be placed in a rack to dry, in a cool place.

Do not be led away with the idea that the necessary increase in exposure due to the use of a screen forbids our doing any more snap-shot work. Consider the case of a bright July or August day when, with a rapid plate and *f*/16, we find a hundredth of a second an ample time for exposure. Orthochromatic plates can be obtained now-a-days as rapid as ordinary instantaneous plates, so that when using our "5-times" screen the exposure is merely increased to a twentieth of a second. This will admit of comparatively rapid work being done. A plate bathed with erythrosin and ammonia in the way described on a previous page will be extremely rapid, even when used with a "10-times" yellow screen, so intensely does ammoniacal erythrosin sensitise for the greenish-yellow rays. Hence we could safely give such a bathed plate with a "5-times" screen an exposure as rapid as is possible in hand-camera work under ordinary circumstances.

**Fitting the Screen.** As regards fitting the screen to the lens various arrangements for the purpose are now on the market, and a simple device may generally be made with a little ingenuity. For example, the lid of a pill-box may be taken, which will just comfortably fit the hood of the lens, and a hole pierced in this equal in size to the *f*/8 diaphragm or a little larger; over this the screen to be used is attached with a little fish-glue. When using the ordinary box form of hand camera the screen may be sometimes attached by means of a couple of drawing pins to the front, just over the hole in front of the lens. The circular form of screen, which fits inside the lens hood with a split ring is also a convenient form to adopt.

It must not be forgotten that the rays of light passing through the glass screen come to a slightly different "focus," so that it is necessary to focus the image always *through* the screen.

**The Dark-Room.** It is only reasonable that something must be sacrificed in exchange for all the advantages derived from the use of orthochromatic plates, nevertheless the extra care necessitated by their employment is not very alarming.

It will be readily understood that the mere fact of a plate being colour sensitive limits the choice of colour available for illuminating the dark-room. Thus canary fabric and yellow lights of any kind must at once be deleted from the category, as it is obvious that yellow sensitive plates will become fogged if exposed to yellow light.

For the ordinary greenish-yellow sensitive plate plenty of pure ruby light is available; but it must be really red, and not orange. The plates should never be taken out of the dish during their development and "looked through"; examination by transmitted light almost invariably leads to fog.

Panchromatic or red sensitive plates require still more careful treatment, and the best results are probably obtained by working entirely in the dark by the time method of development. A lamp fitted with two thicknesses of double-flashed ruby glass is generally safe, but it should if possible be tested with a pocket spectroscope, as much of the so-called ruby glass transmits green rays, in which candle, gas and incandescent electric light is particularly rich.

"Safe-lights" are made by fitting the lantern with a sheet of glass coated with stained gelatine or collodion, and dyes can then be chosen which will admit only of pure red rays passing into the dark-room. (It must be borne in mind that even panchromatic plates are in general only sensitive as far as the C Fraunhofer line, so that light composed of rays in the B to A region of the spectrum is "safe.")

Much has been written about special developers for colour sensitive plates, but as a matter of practice it will be found that no one reducing agent is any better than another with a good make of plate. Pyro-soda is excellent, metol-hydroquinone is quite satisfactory, and all the newer developers will be found equally good.

Many photographers prefer to use backed plates for orthochromatic work. Backing is essential for such work as picture copying, etc., and especially is it desirable when testing a plate for colour sensitiveness, as the light reflected from the back of the film is apt to give rise to very misleading results. It is

hardly necessary to point out that a burnt sienna or red backing is quite useless when a colour-sensitive plate is in question, a dead black medium being alone efficacious. If a backing be prepared with caramel or gum and Indian ink, instead of sienna, a perfectly good result will be obtained. For ordinary purpose, however, a piece of dead black paper placed under the plate in the dark slide will obviate a good deal of halation, and it is only under the more trying circumstances that a backing medium in optical contact is essential.

**Developers for Isochromatic Plates.** Certain colour-sensitive plates, especially some kinds of bathed plates, are rather susceptible to fog. When developing such plates it is very desirable to use a solution with a minimum tendency to fogging.

The following are particularly suitable for orthochromatic work in this connection.

The first is a pyro-soda developer in two solutions.

| | | |
|---|---|---|
| A. | Pyrogallol | 1 ounce. |
| | Pot. metabisulphite | ½ ,, |
| | Pot. bromide | 15 grains. |
| | Water | 50 ounces. |
| B. | Sodium carbonate | 7 ,, |
| | Sodium sulphate | 7 ,, |
| | Water | 50 ,, |

Use equal parts of each, and carry on development until the high-lights of the image are well through to the back of the plate.

The second is a one-solution formula which works particularly freely from fog :—

| | |
|---|---|
| Edinol | ¼ ounce. |
| Pot. metabisulphite | 1 drachm. |
| Pot. bromide | 6 grains. |
| Pot. carbonate | 1½ ounces. |
| Water | 36 ,, |

Allow the plate plenty of time for development, as the density of the image is somewhat deceptive, a good deal being lost in the fixing. This developer brings out all details and gives excellent gradation.

**Contrasts.** Two points should be borne in mind, however. Negatives made on plates of the erythrosin type, such as the majority of commercial "orthochromatic" plates, are apt to be a little hard, frequently owing to

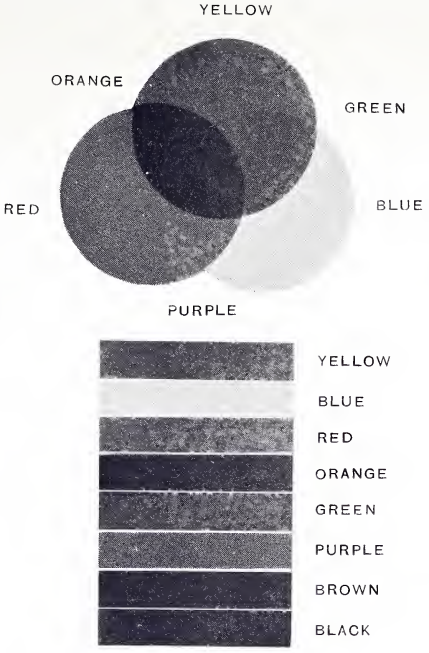
Fig. 25 (p. 29).

$f/22$, $\frac{1}{8}$ sec.

$f/32$, $\frac{1}{8}$ sec.

$f/45$, $\frac{1}{8}$ sec.

TESTING COLOUR SCREEN.




ORDINARY PLATE.

Fig. 27. Compare figs. 11, 12, 27, 28, 29.

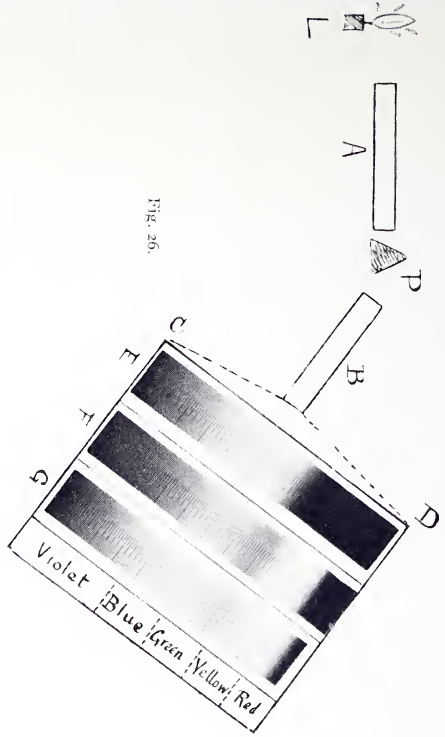



Fig. 26.

insufficient exposure having been given. The effect of erythrosin, and in fact most fluorescin derivatives, is to steepen the characteristic curve of the emulsion, and hence our developer should be arranged so as to give a soft result. Only use sufficient bromide to keep the whites of the negative pure, and take about one-third as much again of the alkali as usual, and finally dilute the mixed developer with a third or half its volume of water.

Although still a matter of some dispute, it seems true that the gradation of the negative is steeper (and therefore the result harsher), according as the light filter cuts off more and more of the violet end of the spectrum. Thus in making a set of negatives for a three-colour print, the green-sensation negative is usually harsher than the blues and the red harsher than the green.

**Modifying the Developer.** It is, therefore, probable that when once the more visually active rays of the spectrum are brought to cause chemical action in the plate, they produce greater reducing effect on the silver bromide than the rays of smaller wave-length. Hence we may take it as a maxim that the more orange or red our light filter is, the more alkaline should be our developer, or the greater exposure (above normal) should be given in order to obtain a soft, well-gradated picture.

This may sound a little complicated, but it is not really so, and we would earnestly invite the *pictorial* reader to take it to heart.

As regards fixing and washing, no deviation from the ordinary methods is advisable.

**After-treatment of Negatives.** One of the most common mistakes made in orthochromatic photography, especially in out-door and landscape work, is over-exposure. When multiplying what we should consider the normal exposure by the factor due to the isochromatic screen, we are very apt to "over-do it." The result is, of course, flat negatives too full of half-tone, often useless to print from.

Orthochromatic plates may be reduced and intensified just as the ordinary kinds, but in these cases

of great over-exposure we recommend one particular method of procedure. The negative is first intensified with mercury, then washed and dried, and finally reduced with hypo and ferricyanide.

Thoroughly wash the negative first of all, then let it remain in the following solution until thoroughly bleached:—

| | | | |
|---|---|---|---|
| Mercuric chloride | 7 | grms. | or parts. |
| Ammonium chloride | 4·5 | ,, | or ,, |
| Water | 250 | cc. | or ,, |

When bleached, give it a good wash for five minutes under running tap water, then place it in a ten per cent. solution of ammonia until re-blackened, and afterwards wash it for ten minutes and let it dry.

The negative, as soon as dry, can now be reduced by placing it in twenty per cent. hypo. solution, to which a few drops per ounce of the following have been added:

| | |
|---|---|
| Potassium ferricyanide | 1 part. |
| Distilled water | 10 parts. |

Do not add too much ferricyanide solution, as reduction should proceed *very* slowly in order to allow as much control as possible over the process.

When the negative has been reduced to a bright, plucky picture of the correct density, quickly remove it, and after a quarter of an hour's wash in running water allow it to dry.

This method, simple though it sounds, nevertheless works so satisfactorily that it rarely fails to produce a *good* negative from what would otherwise be a useless failure.

## Orthochromatism in Pictorial Work.

By EUSTACE CALLAND.

IN a previous article in *The Practical Photographer** the subject of tones and values was discussed, but the further consideration of colour values was only partially dealt with. Here we find ourselves in a region less precisely defined, more ruled by sentiment, and less capable of exact expression, than when dealing with the amount of light received by the various objects that form

*No. 16. Pictorial Composition.

our picture; that is to say, when looking at the matter from the artist's standpoint, it does not concern us greatly to know the comparative luminosities of colours, although a knowledge of the science of colour may help both painter and photographer in the intelligent use of their respective media. The actual monochrome value of colours is, even if generally agreed upon, subject to much variation, according to idiosyncrasy, caprice, sensitiveness, or whatever term may be employed to denote a personal preference.

**Colour a means of expressing Individuality in Photography.**

This variation may be a factor in the expression of personality in pictorial photographs. It is certain that some people are more sensitive to colour and its harmonious combination than others, and that some colours affect them more powerfully than other colours. In any circumstances a picture to be fully satisfying must convey the difference of colour sensation in the order observed by the normal eye, even if without these differences of translation the picture makes a pleasing decorative pattern in light and shade. Having conventionalized the tones of our subject in the limits of scale of our printing process, we can embroider that convention with a local variation due to our personal predilection for colour.

**Colour and Tone.**

We may repeat here that objects in the same light and plane are *in the same tone*, no matter what colour they may be. But we may so choose the colours of two objects, say a red and blue, that a faithful rendering of their relative luminosites in monochrome would make them indistinguishable. Nearly everyone, however, will feel that one should be a little lighter or a little darker than the other.

**A "Feeling" for Colour.**

It is very desirable to have a feeling for colour, and to cultivate the ability to translate it into black and white. The earlier photographers quite tabooed the subject of colour; what could it have to do with them? Had not the public grown to like white skies; or, more terrible still, clouds portending a hurricane, foliage metallic in outline

and uniformly dark, grass and roads in brilliant contrast, and the faces of photographic sitters as white as their collars, without suggestion of the natural colour of the human skin? Even in latter days we are counselled to avoid subjects depending for their beauty upon colour: but whether the expression of these charming colours in one term is pleasing must depend on the artist and his appliances; neither mezzotinter nor etcher will choose a subject that is merely a mosaic of delightful hues in the same or closely allied tones, but they will not eschew scenes that are full of colour, and we often hear the term full of colour applied to their work, implying that a suggestion of it has been felt by others.

**Colour in Landscape.** Although colour must receive attention throughout the whole field of pictorial art, whatever the subject treated, it is of paramount importance in landscape, not only because the greater part of pictorial work is in landscape, but also because so much can be done by purely photographic means, and there is seldom a scene in Nature in which colour does not play an important part.

**Still Life.** In still life, with which we may class flower studies, colour is equally important; but, unfortunately, there is no very great interest in the most perfectly arranged and colour corrected studies of fruit and flowers in monochrome. The exquisite flower groups of Fantin Latour or Francis James would be mere dullness without colour, though doubtless the former would show pleasing chiaroscuro.

**A Spring Landscape.** The spring and early summer is perhaps the season when the photographer has most need of all the forces at his command. But it is the time when the days are long and there is plenty of light to penetrate yellow glass and dyed emulsions, and yet allow fairly rapid exposures. The spring landscape, let us hope, is familiar to all who use a camera with serious intention from the time when the swelling buds tint the distant woodlands to the months when primrose and wild hyacinth enrich the hedge-

rows and carpet the spaces under the trees, and the apple orchards run a brief riot of white and pink. The variety of tint when the trees are renewing their foliage, most of it in shades of yellowish green, brown, pink and raw sienna, calls at once for good colour interpretation, for these tints belong to the warm end of the colour scale, and must not be dark and uniform, as the ordinary photograph will probably show them. A spring landscape must be light, joyous, sunny, and yet delicate in feeling; or, if it be evening, still more tender and expressive of subtle contrasts, the pale mantle of new greens just detached perhaps from the misty hillside, and in another direction heightened in tone by the rays of the setting sun.

**Midsummer.** In the full tide of the summer the green of the foliage will need less consideration, but must never be too dark in a full light, leaving out, of course, such fine naturally dark masses as yews and cedars afford. In July and August come the growth of wayside weeds, fields chequered with the yellow of mustard, the red glow of the poppy and the velvety crimson of clover. Often the contrasting tones they would yield, if sympathetically realized, would justify the monochrome selection of a subject admittedly owing much of its charm to colour.

I can call to mind the rolling landscape between Andover and Salisbury as I traversed it on a July morning after a night of rain, with a beautiful fresh sky—blue blended with green and violet—and flocks of clouds coming up to cast pleasant shadows; the great fields, one tinted with yellow, another emerald, and some dyed scarlet with the poppy, the shadows purple and distances blue as indigo. It seemed to me then that here was an opportunity of getting all this gaiety turned into a sober gamut of tones without monotony and with some suggestian of colour, but it would have needed carrying out with fervour and conviction.

**The Cornfield.** A field of ripe corn under some conditions may come sufficiently light in the ordinary way, but just as there is a marked distinction to the eye between the sea of golden grain and the surrounding fields or vegeta-

tion, so must there be in the photograph. It must be lighter than any but a very pale and luminous green, and lighter usually than the blue sky above.

**Gorse.** A favourite theme with photographers is gorse, on account of its detached and irregular grouping. Its peculiarly bright yellow blossoms need to be rendered not far from white. This any good chromatic plate and a medium screen will do.

**Snow.** All who essay winter photography will find the value of colour screens and iso plates in snow scenes. In such work it is feasible to give quick exposures, and the gradations in the snow and shadow detail are much improved through cutting off some of the excess of ultra-violet light that is reflected.

**Seascapes.** The sea vies with the sky in the variety of its hues and their changes. Whether a deep purple blue, or apple green, or streaked with purple shadow or brown tone in rough weather, we should endeavour to get a just value between it and the sky and shore. It is nearly always possible to give a full exposure with the screen and rapid iso plates. The sky should be naturally printable, but the foreground may not be. We may need to carry our correction further by working on the negative as referred to later, for we cannot tolerate warm yellow sand or red cliffs in the sun, or sand dunes with pale grasses as dark masses. They will often be correctly represented as lighter than the blue sea.

**The Sky, Clouds, and Atmosphere.** The sky has already been dealt with in the *Practical Photographer*,* but it is desirable to reiterate the necessity of chromatic correction. The most delicate forms of cloud, the wisps of white on a blue sky, can be obtained with due care. Perhaps the chief difficulty in such subjects is uneven density in the plate which may cause the blue sky to appear patchy, and this may very easily give it quite another aspect. Those beautiful differences of colour seen in early autumn skies or in passing thunder showers where there are warm tints in the clouds, the palest blue

* No. 11. Landscape Photography.

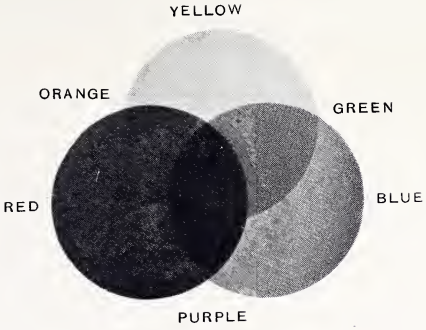


Fig. 28.

ORTHO PLATE AND YELLOW SCREEN.

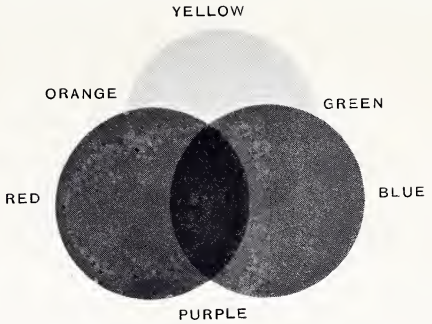


Fig. 29.

RED SENSITIVE PLATE, ORANGE FILTER.

Compare figs. 11, 12, 27, 28, 29.

P.T.O.

**How to use the test colour chart.**—Detach the colour chart in this number and pin it up flat against the wall where it will be evenly lighted by bright diffused daylight, but not by direct sunshine.

**Fig. 27** shows the effect of photographing this test chart with an ordinary plate. Note that the blue comes out much lighter than the yellow, and that the dark violet comes out about equal to the bright yellow and red. The orange is nearly as dark as the black. Compare this result with Figs. 28 & 29.

**Fig. 28** shows the effect of a plate more sensitive to yellow, when used with a yellow screen. It gives us the yellow lighter than the blue. The green also is correspondingly lightened, but the reds are too dark as compared with the blue.

**Fig. 29** shows the effect of a plate which, having a good degree of red sensitiveness used in conjunction with an orange yellow screen, gives us the red and orange decidedly lighter than these colours appear in Fig. 28. Fig. 29 is not absolutely satisfactory but it is better than Fig. 28, and correspondingly much better than Fig. 27.

green in the interspaces near the horizon, whilst above they are strongly blue, are never given with variety in monochrome as they would be, for example, if truthfully copied from a painting. The colours seem all swallowed up in the general actinism, and there is much left to be done on the negative or in the development of the print by aid of notes or a retentive memory. The same may be said of those transient effects such as bursts of sunlight partly flooding a landscape with golden light against the slaty darkness of an oncoming storm.

**Red need not be considered in Landscape.**

In landscape generally we need only concern ourselves with yellow, greens, and blues; red, when it does occur, can be left for after-treatment. There is colour everywhere, there is little or no black anywhere. The general result of applying orthochromatics in our work is that we get less contrast; our picture, therefore, must depend upon delicacy between tone and tone with white—precious on account of its rarity—and, when the sun shines, we have shadows lighter and more transparent. Our masses of foliage in the middle distance will no longer be strongly dark against the sky, and the photograph will more resemble the copy of a good picture painted with regard to values. Compare two negatives of a view with various tints of green, one isochromatic, and exposed through a light filter, the other an ordinary plate; the former will appear more filled up, there will seem less contrast, and if properly exposed less bare glass.

**Sky and Landscape on one Plate.**

A light filter and appropriate plate makes this easier of accomplishment, but except in an open landscape where the exposure is a little more equalised, there must always be some sacrifice. Still, it may be so desirable to have a particular cloud effect associated with a landscape, that it is often worth a good deal of trouble in working on the negative so that all may print in harmony. Generally, the landscape will not want half the printing exposure demanded by the sky portion.

**Oriental Colour.** The colour that is met with in the East presents problems with which few, if any, photographers have grappled. Especially in the life of the cities, where the streets are narrow and shadows dark, and the colour elements largely made up of the crowded native population, the difficulties are intensified. Even those who have never left these islands are familiar with many faithful transcripts by painters, representing throngs of natives in gorgeous raiment, buildings brilliantly white or pink, perhaps with one side deep in violet shadow, a sky of such depth and intensity that a literal transcript in ordinary photography would be impossible.

For such effects one can only suggest taking a photograph in the usual way and retaining a vivid recollection of the principal values, or preferably making a slight sketch with notes and subsequently working on the negative and controlling the process of print making. A screen could not be used, as anyone will affirm who has used a camera in such places, the shadows are deceptive and need rather a long exposure under any conditions. More often than otherwise the middle distance and even foreground in lands such as Egypt or India, when working away from the sun, should be many times lighter than the sky.

**Colour in Portraiture.** It is a pity that the use of a fully correcting screen is prohibitive in the case of child portraits on account of the length of exposure, for the colour in a child's face, the varied tints of hair and depth of colour of the eyes are all so important that some after-treatment must usually be resorted to. In portraits where a slight increase in exposure can be given, the iso plate will be found to reduce the need for retouching. It is common with professional photographers to put a wash of colour on the hair in the negative where it is light or golden in colour, but all colour alterations which involve modelling can only be worked with safety by those who have some fair knowledge of drawing from life, and are at least familiar with the superficial anatomy of the figure.

**"Orthochromatics," by After-treatment.** I have already enumerated several instances in which colour correction, although specially indicated, must remain unaccomplished until the negative has been developed. Street scenes generally, and especially those in Eastern cities already referred to, and many beautiful pastoral studies, in which are sheep or cattle or other figures and the light is feeble, in all these the principal passages of colour that come falsely can be made truer by the well-known methods, certainly rather rough and ready, of matt varnish on the back of the negative, shading, washes of colour, etc.

The objection is that such clumsy artifices cannot be applied to the delicate tracery of leaves and branches against a sky or other background which should be darker.*

**Printing.** The printing process may and should be susceptible to at least slight modification, and very often, as in the case of gum bichromate, values may be altered to an unlimited extent. Except, however, in the hands of an expert, and not always then, this process is not an ideal one, where the delicate gradations representing colour differences are sought for. These subtle differences of tone are the essential part of some effects, and an attribute peculiar to photography, not possible with the same economy of tone in any other pictorial craft,—therefore, we should be chary of giving up those printing methods that will give us delicate gradations when necessary.

**Technical Considerations.** It is not essential for the pictorial photographer to go very deeply into the theory of light filters and orthochromatic plates, and there is now no necessity for him to make either the one or the other. Not that we would for a moment discourage investigation and acquaintance with principles; but the artist has quite enough to do in his own special province, and may content himself, as in the sphere of painting, with an intelligent knowledge of the application of his tools and materials.

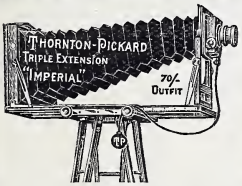
* *The Practical Photographer*, No. 7. After-treatment of the Negative.

**Colour Screens.** The advice may be offered to always use iso plates unless for some exceptional subjects demanding great speed, and to have two colour screens properly adjusted to the emulsion, the light one increasing exposure say three times, making an instantaneous exposure often possible in a good light; and another increasing exposure 20 times where a very full correction of a difficult subject is to be made. The plates used should be the fastest of the series if there is more than one rapidity made. Much judgment must be exercised in the use of the screens, and it may be taken for granted that no correction worth mentioning in outdoor work is visible without employing them, although the plates be isochromatic.

**Over-Correction.** It is quite easy to get over-correction. I have an example of lawns and gravel walks which print equally light in the negative. The light reflecting quality of an object must be remembered as well as its apparent colour. In sunshine, under favourable conditions of atmosphere, grass and trees will only need the pale correcting screen; a screen of this kind for landscape is adjusted for yellow-greens and will suffice for most subjects.

The position of the screen is a mere matter of convenience. If it fits on the lens as a cap, some kind of hood is needed to prevent reflections; if of square shape, for other than hand cameras, it is better inside, just behind the lens, and can be made to slide into two grooves, so keeping it in position. This is convenient when more than one lens is carried.

**Development of Isochromatic Plates.** It is, I believe, a fact that isochromatic plates give better colour values when developed rapidly with an agent of the metol class, than slowly with pyro. Anyway, it is an advantage for development to take place quickly, and if the dish be kept covered, quite a bright light may be used in the dark-room, if of the right quality, that is to say a light that would only fog the plate very slowly. It should be remembered that an under-exposed ortho plate will not give as good a result as a correctly exposed ordinary plate.

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**THE 'BURCHETT' COLOUR SCREENS** are a very considerable advance on the old orange screen and other methods hitherto employed to secure the true monochromatic value of the colours met with in Nature. They are the outcome of a series of practical experiments by the inventor, and are manufactured in three descriptions.

The No. I. Screen may be employed for very rapid effects and for portraiture. Whilst not perhaps giving the fine results obtained with the use of the green and yellow glass, it has sufficient orthochromatic effect to improve vastly the rendering of skies and foliage, while *barely doubling the exposure.* (Increases exposure 1½ to 2 times.) Light yellowish-green glass.

No. II. Screen is *recommended for all ordinary work. Either Isochromatic or ordinary plates can be used,* the former where the delicacy and refinement is wanted, and the latter where the object aimed at is more a contrast of light and shade. (Increases exposure 2½ to 3 times.) Light green and amber glass.

No. III. is specially adapted for *open* landscape, copying paintings, and reproductions for photo-mechanical work. Here Isochromatic plates give better results. (Increases exposure 9 times.) Darker green and amber glass.

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**The Practical Photographer's Annual and Dictionary** of Photographic Daily Practice is now published (1/6 net), and is in great demand. Modesty forbids our saying anything about this book beyond the fact that its general plan is somewhat of a new departure in photographic literature.

The book contains 160 pages of reading and reference matter. In other words it is 2½ times the size of the usual monthly issue of *The Practical Photographer*. Its contents are grouped into four sections, and each section is arranged on the alphabetical plan as far as that is practicable.

1. **Practical Hints,** dodges, tips, makeshifts, repairs, tests, etc. Thus, opening the book at random, we find backing plates, bottles to clean, bottles to cut, blacking for inside cameras, brass to soften, harden, clean, stain, lacquer, bright negatives, bromide paper, brushes, etc., and so on all through the alphabet.
2. **Formulæ,** tables and reference matter generally, such as angle of view, depth of focus, weights, measures. About a score of reliable toning baths, between thirty and forty well-tested developers, and so on.
3. The **Directory of Photographic Societies** of Great Britain is not merely a list of societies and office bearers, but wherever possible we give date of founding, number of members, place of meeting, subscription rates, club accommodation, dark-rooms, apparatus, library, exhibition, etc.
4. The closing section consists of a set of one-page **Indices** to the first twelve numbers of the present (library) series of *The Practical Photographer*, so that one may see at a glance where any bit of information may be found.

Seeing that we ourselves have had over a score letters from strangers offering to give two, three, and in some instances four shillings for *Number One* of *The Practical Photographer*, it would seem likely that *Number One* of the *Annual* is worth buying at the modest price of 1/6. *(Verb. sap. sat.).*

**Messrs. Lizars** (Liverpool), ask us to say they are starting a new series of four free lessons for beginners on Thursdays. These will be followed by a more complete series of four lessons on retouching, carbon, platinotype, etc., on Saturdays. For this course of four lessons a charge of 5/- is made. This firm is inaugurating "Lizars' Magazine,"—*i.e.*, a 16-page tracklet designed to keep the firm in touch with their numerous customers by letting them know all the latest and best things in the way of apparatus and sundries. We wish the firm every success both with their lectures and magazine.

**Messrs. Hampton & Co.** send us a copy of the new edition of Photo-Mechanical Processes by W. T. Wilkinson, one of the teachers at the Goldsmiths' institute, etc. The work it deals with is line and half-tone block making, photo-lithography, collotype, photogravure, and isochromatic work, and among other illustrations contains a three-colour half-tone print and another print in photo-litho. in colour printing. The author has hardly page space to do full justice to the very wide field hereinbefore set out, but into the 200 pages he has contrived to compress a great deal of sound and practical instruction. We can confidently recommend this book to the photo-mechanical student.

**Messrs. A. Curtis** (Meadow Court Road, Lee, S.E.), have sent us a trial sample of their "Lisle" P.O.P., which we find is remarkably easy to work, and gives good tones with the bath recommended by the makers, viz.: Gold Chloride and Ammonium Sulphocyanide. We also find that it tones easily and uniformly with our own favourite Phosphate bath. The paper is rather thicker than ordinary P.O.P., but not too thick for comfortable working, and yet is stiff enough to do without mounting in the case of small sizes. This feature will no doubt help to make "Lisle" P.O.P. a popular brand

**Messrs. Houghton** send us the Photographer's Peerless Exposure Note Book. It includes an exposure calculator on the slide-rule principle, a general Accident Insurance Coupon for £1000, various formulæ, a long list of photographic dealers' addresses, and ruled spaces for entering 700 exposures. Our only fault to find with this useful pocket companion is that there is hardly enough room allowed for entering up the details of the exposure. It lies within the experience of us all that should we at any time omit to jot down the date, or hour, or stop, or some other item we think of no moment, it is just this omitted and forgotten item that we want to know sooner or later. Again and again have we urged our readers to make a full and careful record entry of every exposure, and this handy little note-book is an aid to so doing.

GANNETS ON NESTS WITH YOUNG. [*Photo. Chas. Kirk.*

"156, SAUCHIEHALL ST.,
GLASGOW.
*May 9, 1905.*

Messrs. Elliott & Sons,
Gentlemen,

With reference to my book of bird photographs, I have great satisfaction in stating that most of the negatives were made on Barnet Plates, and since the introduction of the Barnet Ortho. Plate a new power has been placed in the hands of those who specialise in the photography of living wild birds. I have always found these plates of sufficient rapidity—even for focal-plane work—giving good rendering of colour values without use of a screen, and in every way to be highly commended to the naturalist photographer.

Yours truly,
CHARLES KIRK."

YOU cannot take a faithful picture on ordinary plates. A perfect landscape photograph should have true gradation of tone, with the most delicate clouds faithfully rendered. Snow mountains should appear as they are seen, yellows and greens reproduced—not as black and white patches, but in their proper shades. The Barnet Ortho. Plate does all this and possesses no disadvantages. Ordinary plates may be of the very highest order, but they can never do what Ortho. Plates will do, for it is scientifically impossible. Moreover, the Barnet Plate is very rapid and only costs **1/-** per doz. for $\frac{1}{4}$-plate size.

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Price **1/-** per doz. $\frac{1}{4}$-plates.

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**Messrs. Elliott & Sons** (Barnet) have just published the 20th century edition of the world-famous "Barnet Book of Photography." This is not a new edition of the former work, but an entirely new book carried out on the general lines of its predecessor. The contents include Negative Making and Pictorial Photography (A. Horsley Hinton), Orthochromatic Plates, etc. (J. McIntosh), Film Photography (P. G. R. Wright), Lantern Slides (S. L. Coulthurst), Lenses (C. W. Piper), Hand Camera (E. H. Carpenter), Portraiture (F. C. Lambert), P.O.P. (W. E. A. Drinkwater), Bromide Printing (C. W. Somerville), Carbon Printing (H. W. Bennett), Ozotype (T. Manly), Formulæ, etc. These authors' names are at once a sufficient guarantee that the chapters are informative, reliable and practical. We have no doubt whatever that this edition will enjoy as wide and deserved a popularity as did its admirable predecessor. The new edition sells at 1s. 6d.

**Messrs. Kodak** sends us a descriptive pamphlet concerning their "New Kodak Tank Developer." The exposed film, in a suitable wooden box, is wound off between the folds of a long red celluloid strip or "apron," which protects it from light, but permits access of the developer. This roll is then placed in a cylindrical tank for stand development, thus abolishing the need of any handle-turning. Development takes normally about twenty minutes, and as the tank requires no attention whatever during this operation, the worker is quite at liberty to occupy the time by printing, writing, reading, etc. After development the film is fixed, washed and dried in the usual manner. We should imagine that the traveller or occasional worker will find this tank system a great convenience.

**Messrs. Percy Lund, Humphries & Co.** (Bradford) have sent us a sample packet of labels for numbering pictures in exhibitions. These are neatly printed, *i.e.*, small clear numerals on neutral gray paper of a tint not likely to clash with any mount or frame. They run from 1 to 300 and are gummed and perforated ready for use. These labels will supply a long and deeply felt want. Photographic exhibition judges for years have been complaining and groaning about the wholesale *murder* of pictures by the use of white paper labels. The present writer has, in season and out of season, for the last ten years been asking exhibition officials to use grey paper labels, and the reply has always been, "We don't know where to get them." This problem may now be solved by sending one shilling to our publishers for a specimen packet. This we urge all Hon. Secs. to do forthwith.

**Messrs. Houghton** (Holborn) draw our attention to their latest novelty, the "Phosys File." Briefly put, this is a cabinet of one or more drawers for keeping mounted prints in order on the card-index system. This enables the prints to be readily rearranged and grouped as varying circumstances may suggest. The Phosys is a fitting companion to the Negasys, or negative file, which we mentioned in our last number; and to both we can extend a hearty welcome as being practical aids to storage on a rational and convenient system. "System is a good saver" is an old and true saying, and any device which saves our time, trouble and temper adds something to our enjoyment of existence. The prices of the Phosys file range from five shillings to five guineas.

**Messrs. Elliott & Sons** (Barnet) have sent us a sample package of their latest introduction, *viz.*, a high-speed plate known as the "Red Seal Brand." Our experiments lead us to the conclusion that these plates are quite remarkable for three things—their freedom from fog and cleanness in working, their high speed, and the ease with which ample density can be obtained with the ordinary developer. These plates are being sold at the popular prices, *viz.*, 1s. for ¼-plate size, 2s. 3d. for ½-plate size, and so on. With all these things in their favour it becomes an easy matter to prophesy a great popularity for this very excellent brand.

The Third Annual Scottish National Photographic Salon will be opened Saturday, January 13th, 1906, at the Victoria Art Galleries, Dundee. Hon. Sec., V. C. Baird, Esq., Broughty Ferry.

**The Practical Photographer's Annual** contains a list of places of photographic interest, and how to obtain permission to photograph.

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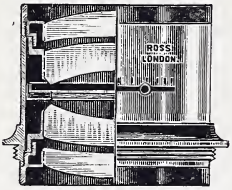


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**Messrs. Kodak** have sent us a sample package of the Eastman Dry Plates. On trial in the studio we find them remarkably rapid, clean and fogless in working. They very easily give generous density. Indeed, we may confess that our first trial was a little over-developed. For relying on past experience, we made the usual allowance for loss of density in fixing, but found that the plate left the fixing bath a degree more plucky than we had anticipated. Now that there are so many forms of pocket and tourist cameras that permit the use of plates or films at will, we anticipate that these Eastman Plates will become as generally known and widely appreciated as the world-famous Kodak films.

**The Gem Dry Plate Company** (Willesden Green) have sent us specimens of their colour sensitive plates which are made in two brands, viz.: "Colour" and "Tricol." On trial we find the former well suited for dealing with landscape work generally, and the latter for the more trying work of flowers, picture copying, and other work where sensitiveness to the red part of the spectrum is required. We may say that some short time back we used a number of Tricol plates when photographing some rather trying architectural subjects, viz.: collegiate buildings, ivy-clad, crumbling red cloisters, etc., and found a considerable latitude of exposure (with a 10 times yellow colour screen) was possible, and that the negatives left the fixing bath bright and clean. The Gem Colour and Tricol plates only require to be known to be widely appreciated.

**Messrs. Ilford, Ltd.**, have sent us a sample of a new P.O.P. that is likely and deserves to become very popular. This is called "Carbon Surface," and yields results remarkably like that well-known process. In all other respects this P.O.P. is like the familiar P.O.P. It may be worth mentioning that Messrs. Ilford manufacture a "Special" P.O.P., which we have frequently found of the greatest use when wishing to make a soft and delicate print from a somewhat over-plucky negative. This "Special" P.O.P. is not a new introduction, but we here mention it because it does not seem sufficiently generally known, and we have found it of great service on certain occasions.

**The Practical Photographer's Annual** includes over a hundred formulæ for carbon, platinotype, P.O.P., bromide papers, etc.

## Prints for Criticism and Competitions.

*Will competitors and others please kindly note our rule to the effect that when prints are to be returned stamp must be sent* **WITH THE PRINTS**—*not afterwards?*

*Will contributors to our various competitions kindly refrain from sending under one cover prints for different competitions? This not only gives us considerable trouble, but involves the risk of the various pictures not being properly entered for the competition for which they are intended. It is far better for all concerned to send each lot of prints in separate parcels.*

**E. N.** (Bromley Cross).—For Hypo Alum toning *vide Practical Photographer*, No. 1, page 22. You will also find formula on page 96 of *The Practical Photographer's Annual*, together with several other Bromide toning baths. We prefer the soft effect of the slightly rough surface. The "dull evening" is better composition than the "January day." Both are too square in shape; the upper part of sky (in both) should be a *little* darker. Bare branch trees nearer than 100 yards are seldom satisfactory in a picture.

**The Practical Photographer's Annual** contains a practical outline of the characteristics of architectural styles.

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**THE GEM DRY PLATE CO., LTD., WILLESDEN GREEN, LONDON, N.W.**

**J. R. R.** (Burnley).—We quite see your intention and applaud your effort, although it is not entirely successful. The following points should engage your careful attention. Colour of mount is too near that of the higher tones of the print. Best part is the middle distance; the foreground is not sufficiently defined, even for a storm effect. Bear in mind that there is in nature always a differentiation of definition, *i.e.*, the immediate foreground always shows more detail and also more light and shade contrast than the middle distance, and that in turn more than the extreme distance. Indeed, it is this gradually falling off in definition and reduced contrasts that give us the idea of distance. In your print it would be better if the upper part of the sky were a little darker than the lower part. But the difference should not be great.

**W. L. F.** (Workington).—In both cases you make the mistake of surrounding your print with a narrow band of white, which by force of contrast degrades the high-lights of the print. Instead of white try a very light grey. Also your mounting paper (green) should first be pasted down to stout card. A curly cockling mount is enough to spoil any picture and always looks untidy and unfinished. Your landscape picture is sadly in want of a little suggestion of cloud, or graduated sky so as to suggest atmosphere rather than paper. The water mill is just a little too chalky in the high-lights, but otherwise very creditable, and would look still better on a rougher paper.

**W. H. H.** (Guildford). The last day of month being a Sunday every one was allowed one day's grace, so your prints were in time. The lady and dog is a bit of very neat and creditable work, also neatly finished. But it is a mistake to put the dark band midway between margin of print and edge of mount. In general, equal spacing of this kind is to be avoided, as it is apt to attract the eye, and this is just what the mount should not do. It was also a mistake to let the lady look at the camera. This always gives a "know-I'm-being-photographed" expression, and that is just the one expression one never does want in a serious photograph. You entirely omit to give any details whatever as regards production, so that you limit the help that we might have been able to give. Your negative is slightly over-developed, as the high-lights are beginning to block up.

**O. W. F. T.** (Derby).—Far too many blossoms in so small a space. Your picture, therefore, looks overcrowded. One of the chief secrets in flower work is simplicity. Do not try to get in as many as you can, but try to see how few blossoms you can use to make your picture. You will notice that all the best results in our Floral Number (*Practical Photographer*, 19), are characterised by simplicity.

**E. M. C.** (Norwich). 1. The intruding half of the tree on our right should have been avoided. The print, generally, is dull and flat, and suggests slight over-printing. The negative is at fault, *i.e.*, the greens come too dark. This is a case where an ortho plate should have been used. See how dead and dull the grass looks. The sky also is too papery. 2. Here again the foreground greenery is all one dull, dead, dark mass. No light and shade, no variation. The exposure was considerably under-done. The print also is over-printed. It certainly does not give one the idea of a good light in September. Bear in mind that the exposure must be regulated by the nearest dark part of any importance. In both cases you have good subjects, and have shown taste in the selection of your point of view.

**G. W.** (Glasgow).—(7) Yes, the water is the best part, but the background hillside requires a little more vigour. It is too "all-overish," too much all the same general indefiniteness. This is due to the light being too soft. Not enough contrast or concentration. (8) The exposure is overdone, and apparently the plate is light-fogged, probably by the strong light falling on the lens. The white margin round the print is a mistake. (9) Here, again, this looks like over-exposure, and the same remark as to the white margin might be repeated. Your tendency seems to be in the direction of over-exposure. Try one or two different exposures with the same subject, *e.g.*, *f*/16, giving one plate $\frac{1}{2}$ sec. and another plate $\frac{1}{16}$ or $\frac{1}{26}$ sec., and compare results.

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**J. H. S.** (Leeds).—Neither of these prints is up to your best form. In the pastoral you have two conflicting chief lights, *viz.*, the bright bit of sky-light and the formal row of sheep in strong light. Thus the eye goes from one to the other and back again. In every ship one captain; in every picture one chief high-light. Again, aim at avoiding rows of things, especially if they show spots of strong light or dark. This is a good technical result, but not altogether pictorially strong. The pillar on our left along the margin of the print is too light. You may take it as a good general rule that it is best to keep strong lights away from the margins. The mount is too small for the print, and also of a colour too pronounced, and the lower margin of the print is rather weak.

**A. C.** (Leeds).—(1) This picture would be improved by the free use of the trimming knife. The reflected image of the boy standing at the stream side is too noticeable. You might advantageously cut away $1\frac{3}{4}$ inches from the lower margin. (2) This is too uniformly misty, *i.e.*, in the near as well as distant parts. In nature the further an object is away from us the more is the effect of mist observed, while objects but a few feet away are not appreciably affected. But your near foreground is as misty as objects twenty yards away. (3) A very creditable piece of careful work. Try another print in black and white, and do not use a cut-out mount; or if you do, then tint the bevel edge so that it is grav, not white. This white edge is much too conspicuous.

**M. J. C. M.** (Kirkby Stephen).—(1) This is quite pleasing in all respects, except for the too many scattered patches of very light rock. You might improve the printing quality of this negative by coating the glass side all over with matt varnish, and scraping away (with an old penknife) the varnish from the parts at present printing too light. This would pull the picture together, and well repay the trouble. The other two prints are not at all up to your best form. (2) The figure is far too obviously placed, and seems out of keeping with the scene. The best part of this is the sky. (3) This is flat and lacking in the relief which light and shade give. It is very seldom indeed satisfactory to take a photograph with the sun shining behind the camera, *i.e.*, with the shadows falling away from the spectator.

**W. H. G.** (Bournemouth).—No. 1 is certainly the better of the two prints in every way. Technically this print is well above average, and except for its rather too warm colour is first-class. The white margin round the print is a mistake, as it takes the pluck out of the high-lights of the print itself, and, pictorially, it is a mistake to select such a high view point, *i.e.*, so far above water-level. (2) Here the composition is too formal and too much the same kind of thing on both sides of the median line. The exposure has been rather underdone and the negative over-developed. Hence the hard, chalky high-lights. This makes the water too much like milk. The sky also is practically blank white paper. In No. 1 the sky is quite excellent, and just in right relationship to the light on the water.

**J. P.** (Halifax).—Technically very creditable, and with but little to say in the way of fault finding; but pictorially faulty. *(a)* The camera was too high above ground, making the path seem to run uphill; *(b)* the camera was "bang" in the middle of the path, making a painfully symmetrical picture; *(c)* the figures are all staring at the camera with the "know I'm being photographed" expression—which is just the one expression we ought to try and avoid. Try again, and alter these three points. (2) Though not a very pictorial subject, yet it is what medicos might call a "pretty example." This is an instance calling for a red sensitive plate and a rather deep orange filter, which increases exposure about 50 times.

**A. H. W.** (Gateshead).—Neat and painstaking work of the right kind to form a good foundation. We are glad to see you are also systematic in making entry of details of production. A white line, however narrow, round a print should be used very seldom, as it tends to be too conspicuous, and also, by force of contrast, to take the life out of the high-lights of the picture. (1) Sky part good, but a little too dark in the high-lights. The shadow cast by the water weeds also a little too dark. With ortho plates be generous with exposure. (2) Here the exposure has been very fairly correct. The picture needs the suggestion of clouds, printed in from another negative. Although an ortho plate will sometimes secure clouds, as well as landscape, it does not always follow that these are the best clouds to use.

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| **B18** | 36 | drab | **B018** | 24 |
| **B19** | 36 | brown | **B019** | 24 |

To take sizes up to ¼-plate.

| Ordinary Thickness. Contains No. sheets 12×10 in. | | | Extra Thick Series. Contains No. sheets 12×10 in. | |
|---|---|---|---|---|
| **C** | 24 | assorted colours | **C0** | 16 |
| **C1** | 24 | grosvenor green | **C01** | 16 |
| **C2** | 24 | duffel gray | **C02** | 16 |
| **C3** | 24 | gray bark | **C03** | 16 |
| **C4** | 24 | playfield cream | **C04** | 16 |
| **C5** | 24 | rough white | **C05** | 16 |
| **C6** | 24 | dove | **C06** | 16 |
| **C7** | 24 | deep sea blue | **C07** | 16 |
| **C8** | 24 | autumn brown | **C08** | 16 |
| **C9** | 24 | smoke gray | **C09** | 16 |

To take sizes up to ¼-plate.

| Ordinary Thickness. Contains No. sheets 12×10 in. | | | Extra Thick Series. Contains No. sheets 12×10 in. | |
|---|---|---|---|---|
| **C10** | 24 | fern green | **C010** | 16 |
| **C11** | 24 | coffee | **C011** | 16 |
| **C12** | 24 | wine red | **C012** | 16 |
| **C13** | 24 | black | **C013** | 16 |
| **C14** | 24 | olive green | **C014** | 16 |
| **C15** | 24 | iron gray | **C015** | 16 |
| **C16** | 24 | russet | **C016** | 16 |
| **C17** | 24 | slate | **C017** | 16 |
| **C18** | 24 | drab | **C018** | 16 |
| **C19** | 24 | brown | **C019** | 16 |

The Ordinary Papers are also supplied in large sheets (28×26 in.), price **2/6** per quire.
The Extra Thick Papers are also supplied in large sheets (28×26 in.), at **3/6** per quire of 24 sheets.

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